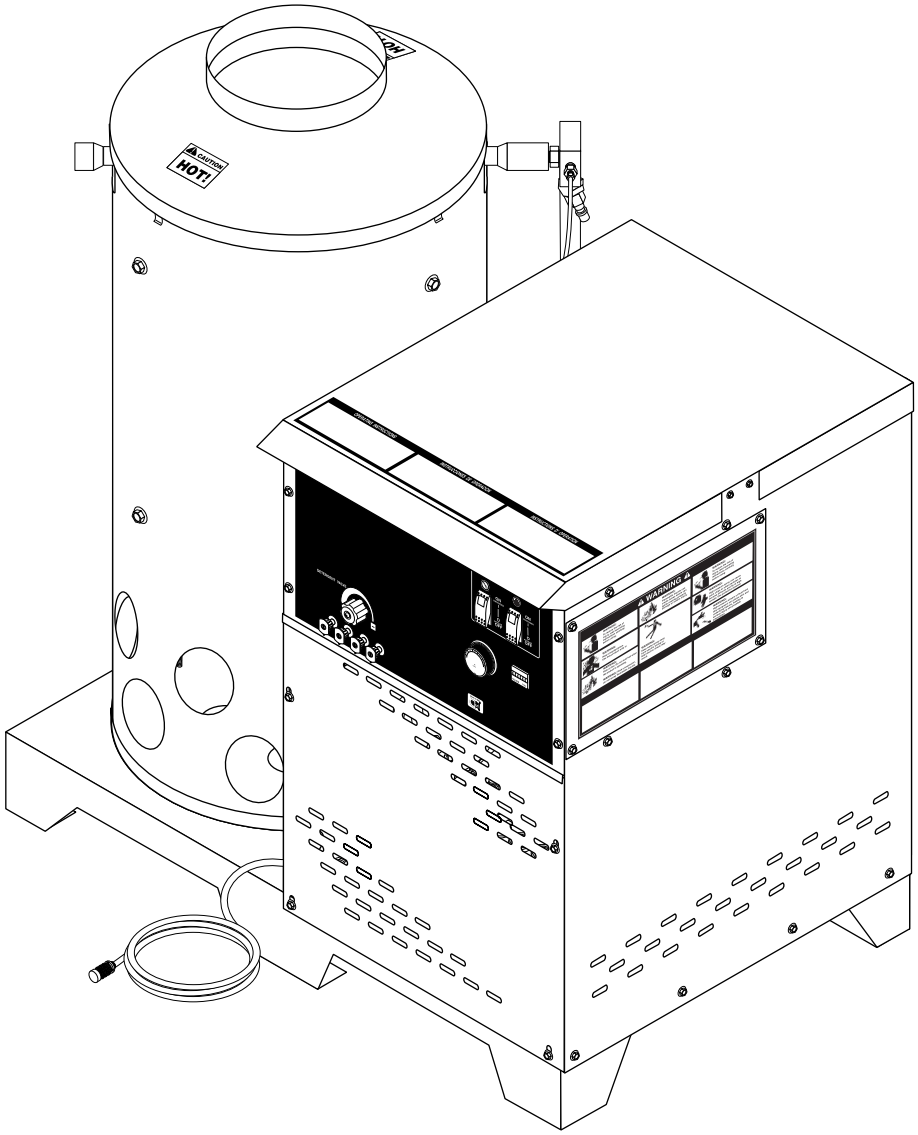
HNG

OPERATOR'S MANUAL

■ HNG-4020 ■ HNG-3530 ■ HNG-5030



For technical assistance or the SHARK dealer nearest you,
visit our website at **www.shark-pw.com**

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Model Number _____

Serial Number _____

Date of Purchase _____

The model and serial numbers will be found on a decal attached to the pressure washer. You should record both serial number and date of purchase and keep in a safe place for future reference.

INTRODUCTION & SAFETY INFORMATION

Thank you for purchasing our Pressure Washer.

This manual covers the operation and maintenance of the 301007D, 352007A, 402007A, 402007B, 402007C, 502007A, 502007B, 502007C, 353007A, 353007B, 353007C, 503007B and 503007C model washers. All information in this manual is based on the latest product information available at the time of printing.

We reserve the right to make changes at any time without incurring any obligation.

This machine was designed for maximum use of 4 hours per day, 5 days per week.

Owner/User Responsibility:

The owner and/or user must have an understanding of the manufacturer's operating instructions and warnings before using this pressure washer. Warning information should be emphasized and understood. If the operator is not fluent in English, the manufacturer's instructions and warnings shall be read to and discussed with the operator in the operator's native language by the purchaser/owner, making sure that the operator comprehends its contents.

Owner and/or user must study and maintain for future reference the manufacturers' instructions

This manual should be considered a permanent part of the machine and should remain with it if machine is resold.

When ordering parts, please specify model and serial number.

IMPORTANT SAFETY INFORMATION

WARNING: When using this machine basic precautions should always be followed, including the following:

CAUTION

READ OPERATOR'S MANUAL THOROUGHLY PRIOR TO USE.

CAUTION: To reduce the risk of injury, read operating instructions carefully before using.

1. Read the owner's manual thoroughly. Failure to follow instructions could cause malfunction of the machine and result in death, serious bodily injury and/or property damage.
2. All installations must comply with local codes. Contact your electrician, plumber, utility company or the selling distributor for specific details. To comply with the National Electrical code (NFPA 70) and provide additional protection from risk of electric shock, this pressure washer is equipped with a UL approved ground fault circuit interrupter (GFCI) power cord for machines rated 250V 30 amp or less, single phase.
3. Know how to stop the machine and bleed pressures quickly. Be thoroughly familiar with the controls.
4. Stay alert. Watch what you are doing.

WARNING

RISK OF EXPLOSION: DO NOT SPRAY FLAMMABLE LIQUIDS.

WARNING: Flammable liquids can create fumes which can ignite causing property damage or severe injury.

5. Risk of explosion - Do not spray flammable liquids or operate in an explosive location. Operate only where open flame or torch is permitted.

WARNING

KEEP WATER SPRAY AWAY FROM ELECTRICAL WIRING.

WARNING: Keep water spray away from electrical wiring or fatal electric shock may result. Read warning tag on electrical cord.

6. To protect the operator from electrical shock, the machine must be electrically grounded. It is the responsibility of the owner to connect this machine to a UL grounded receptacle of proper voltage and amperage ratings. Do not spray water on or near electrical components. Do not touch machine with wet hands or while standing in water. Always disconnect power before servicing.

WARNING: Spray gun kicks back. Hold with both hands.

7. Grip cleaning wand securely with both hands before starting the cleaner. Failure to do this could result in injury from a whipping wand.

WARNING

RISK OF INJECTION OR SEVERE INJURY TO PERSONS. KEEP CLEAR OF NOZZLE.

WARNING: Equipment can produce a high pressure stream of fluid that can pierce skin and its underlying tissues, leading to serious injury and possible amputation.

8. High pressure developed by these machines can cause personal injury or equipment damage. Use caution when operating. Do not direct discharge stream at anyone or at any part of the body, or severe injury or death will result. This machine is to be used only by qualified operators.

INTRODUCTION & SAFETY INFORMATION

WARNING

EXTREMELY HOT: USE CAUTION WHEN OPENING LID.

CAUTION: Hot discharge fluid. Do not touch or direct discharge stream at persons.

9. Never make adjustments on machine while in operation.

WARNING

PROTECTIVE EYEWEAR AND CLOTHING MUST BE WORN.

WARNING: High pressure can cause paint chips or other particles to become airborne and fly at high speeds.

10. Eye safety devices and foot protection must be worn when using this equipment.

WARNING

RISK OF ASPHYXIATION. USE ONLY IN A WELL VENTILATED AREA.

WARNING: Risk of asphyxiation. Use this product only in a well ventilated area.

11. When the machine is working, do not cover or place in a closed space where ventilation is insufficient.
12. Machines with spray guns should not be operated with the trigger in the off position for extensive periods of time as this may cause damage to the pump.
13. Protect from freezing.
14. Be certain all quick coupler fittings are secured before using pressure washer.
15. Do not allow acids, caustic, or abrasive fluids to pass through the pump.
16. Inlet water must be cold and clean fresh water.
17. To reduce the risk of injury, close supervision is necessary when a machine is used near children. Do not allow children to operate the pressure washer. **This machine must be attended during operation**.
18. The best insurance against an accident is precaution and knowledge of the machine.
19. Do not operate this product when fatigued or under the influence of alcohol or drugs. Keep operating area clear of all persons.
20. Do not replace LP tank while machine is running. Serious injury could result.

WARNING

RISK OF FIRE. DO NOT USE WITH FLAMMABLE LIQUIDS.

WARNING: Use only vapor propane fuel.

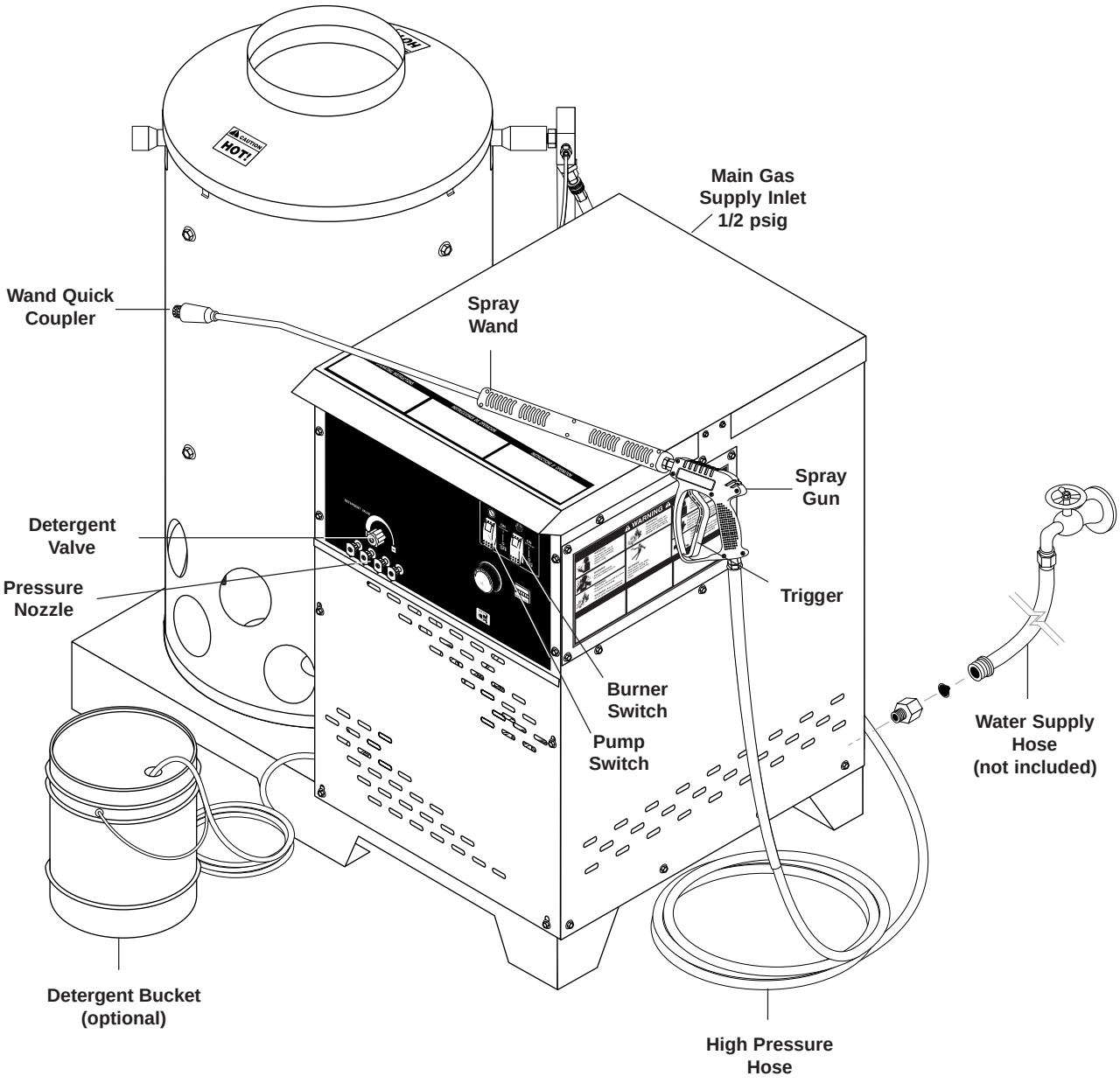
21. This equipment is designed to run on vapor fuel. Do not use liquid fuel. Have a qualified serviceman install and service your equipment.
22. Never expose a spark or flame where unburned gas may be present.
23. Never attempt to light pilot unless pilot manual valve has been shut off for 5 minutes.
24. A conversion kit, as supplied by the manufacturer, shall be used to convert natural gas to propane.
25. L.P. gases are heavier than air and will spill out on the floor. Therefore always provide adequate space and ventilation around these machines. Install machine 18" above the floor.
26. Manufacturer will not be liable for any changes made to our standard machines, or any components not purchased from the manufacturer.
27. Do not overreach or stand on unstable support. Keep good footing and balance at all times.
28. Follow maintenance instructions specified in the manual.

WARNING

RISK OF EXPLOSION: IF GAS SMELL PRESENT TURN OFF SUPPLY

29. When making repairs disconnect from electrical source and shut off gas valve.
30. Turn burner off, open spray gun and cool to 100° F before turning machine off.
31. Extinguish any open flame and test all joints with a soap solution. If odor persists, call your gas supplier immediately.
32. Not suitable for connection to Type B gas vent if the stack temperature exceeds 243° C (470° F).
33. A draft diverter shall be installed if this machine is going to be permanently installed and vented to the outside of the building.

COMPONENT IDENTIFICATION



Pump — Develops high pressure.

Pump/Burner Switch— Controls operation on machine.

Spray Gun — Controls the application of water and detergent onto cleaning surface with trigger device. Includes safety latch.

Detergent Valve — Allows you to siphon and mix detergents.

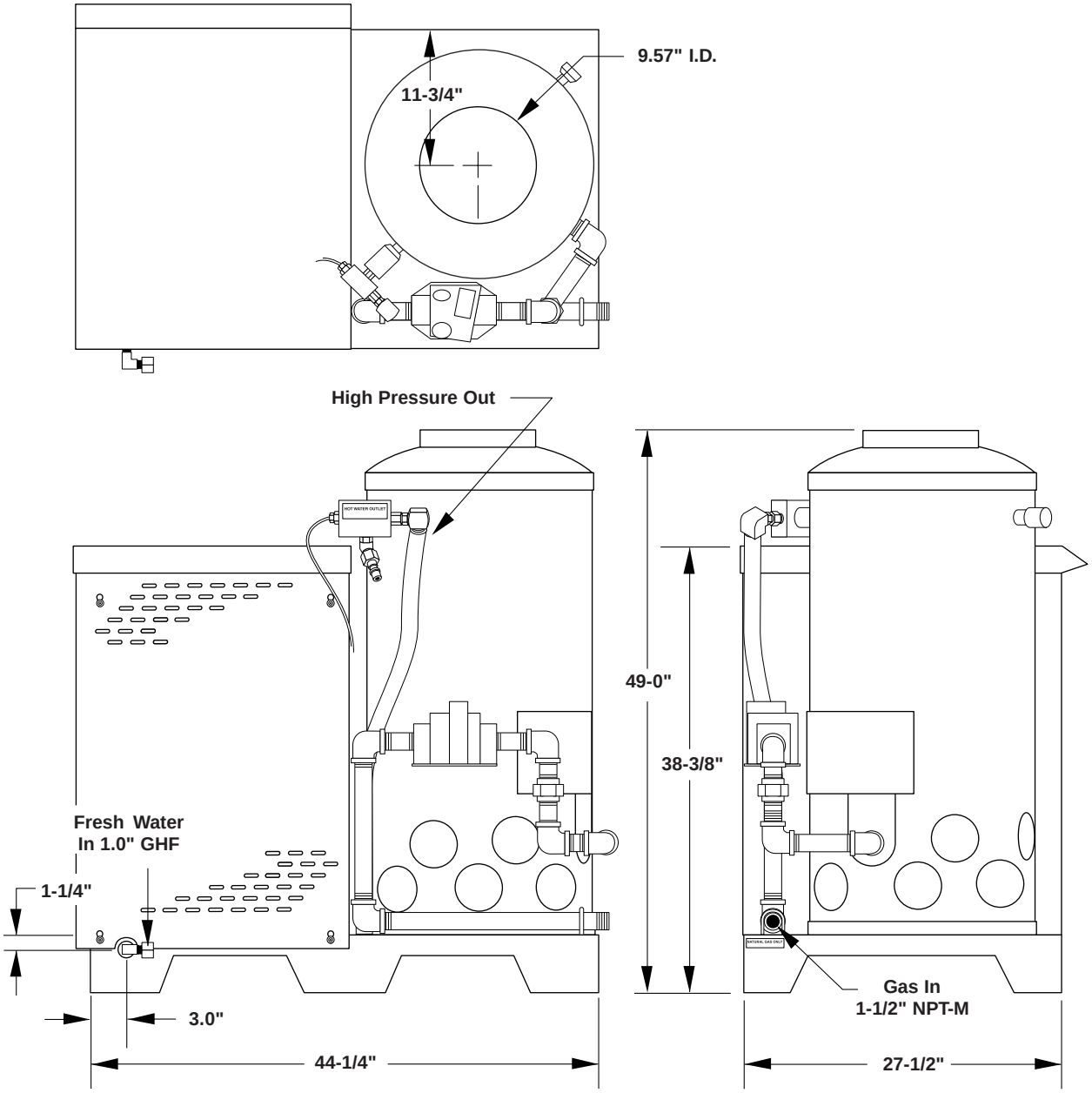
Wand — Must be connected to the spray gun.

High Pressure Hose — Connect one end to water pump discharge nipple and the other end to spray gun.

Wand Quick Coupler — Pulling the brass collar back allows the insertion of pressure nozzle.

Note: **If trigger on spray gun is released for more than 2 minutes, water will leak from valve. Warm water will discharge from pump protector onto floor. This system prevents internal pump damage.**

INSTALLATION



INSTALLATION

Place machine in a convenient location providing ample support, drainage and room for maintenance (see page 8).

Location:

The location should protect the machine from damaging environmental conditions, such as wind, rain and freezing.

1. The machine should be run on a level surface where it is not readily influenced by outside sources such as strong winds, freezing temperatures, rain, etc. The machine should be located considering accessibility for the replacing of components and the refilling of detergents, adjustments and maintenance. Normal precautions should be taken by the operator of the machine to prevent excess moisture from reaching the power unit or electrical controls.
2. It is recommended that a partition be made between the wash area and the machine to prevent direct spray from the spray gun from coming in contact with the machine. Excess moisture reaching the power unit or electrical controls will reduce the machine's life and may cause electrical shorts.
3. During installation of the machine, beware of poorly ventilated locations or areas where exhaust fans may cause an insufficient supply of oxygen. Sufficient combustion can only be obtained when there is a sufficient supply of oxygen available for the amount of fuel being burned. If it is necessary to install a machine in a poorly ventilated area, outside fresh air may have to be piped to the burner and a fan installed to bring the air into the area.
4. Do not locate near any combustible material. Keep all flammable material at least 20 feet away.

   Allow enough space for servicing the machine.

   Local code will require certain distances from floor and walls. (Two feet away should be adequate).

WARNING: Avoid small areas or near exhaust fans.

Gas Codes:

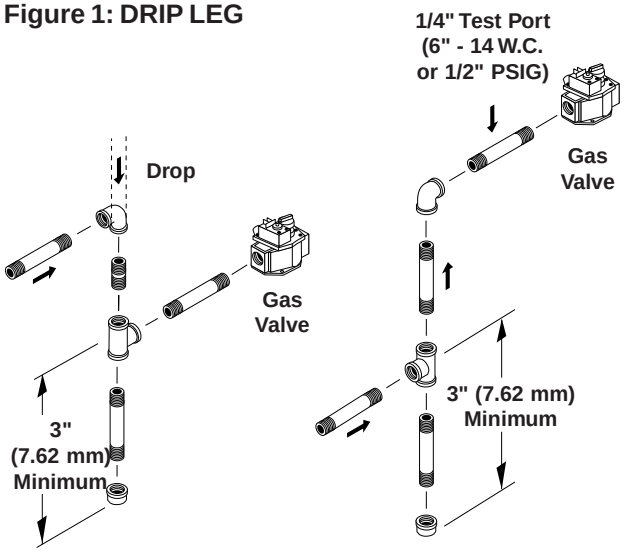
Confer with local gas company and with proper municipal officials regarding any specific code or regulations governing the installation. The installation must conform to local codes.

Electrical:

The machine, when installed, must be electrically grounded in accordance to local codes. Check for proper power supply using a volt meter; check the serial plate for the correct requirements.

Gas Piping:

Figure 1: DRIP LEG

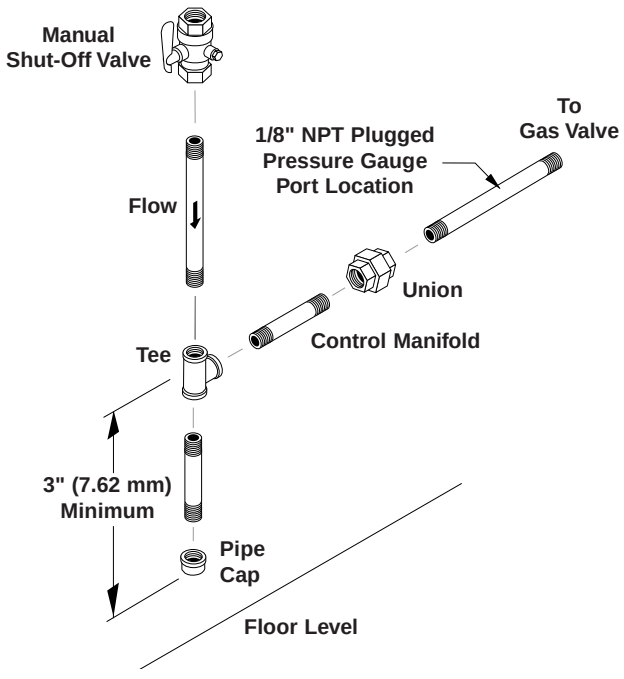


Sediment trap (drip leg) must be installed in the supply line.

Install a union in the gas line adjacent to and upstream from the control manifold and downstream from the manual main shut-off valve. A 1/8" NPT plugged tapping accessible for test gauge connection shall be installed immediately upstream of the gas supply connection for the purpose of determining the gas supply pressure to the burner, and to prevent damage to gas valve.

If a manual gas shut off valve is not in the gas supply line within six feet of the machine and in an accessible location, one shall be installed.

Figure 2: UNION LOCATION



INSTALLATION

The following pipe and stack sizes are just recommendations. Always consult a local plumber and venting contractor for local codes and regulations during installation.

The following tables are maximum capacity of final stage pipe in thousands of Btu/hr of commercial propane

From first stage regulator (at tank) to second stage regulator

The chart below is based on incoming gas pressure of 10 PSI and a pressure drop of 1 PSI. Numbers are for straight schedule 40 pipe; fittings further reduce capacity.

PROPANE

Length of Pipe (ft.)	Iron Pipe Size	
	1/2"	3/4"
10	3339	6982
20	2295	4799
30	1843	3854
40	1577	3298
50	1398	2923
60	1267	2649
70	1165	2437
80	1084	2267
90	1017	2127
100	961	2009
150	772	1613
200	660	1381
250	585	1224
300	530	1109
350	488	1020
400	454	949
450	426	890
500	402	841

From second stage regulator to machine.

The following chart is based on incoming gas pressure of 11 w.c.i. and a pressure drop of .5 w.c.i. Numbers are for straight schedule 40 pipe; fittings further reduce capacity.

PROPANE

Length of pipe (ft.)	Iron Pipe Size		
	1/2"	3/4"	1"
10	291	608	1146
20	200	418	788
30	161	336	632
40	137	287	541
50	122	255	480
60	110	231	435
70	102	212	400
80	94	198	372
90	87	185	349
100	84	175	330

The chart below is based on gas pressure in the range 0-.5 PSI, specific gravity of .6, and pressure loss of .5 w.c.i. Numbers are for straight schedule 40 pipe; fittings further reduce capacity.

NATURAL GAS

Length of Pipe (ft.)	Iron Pipe Size				
	3/4"	1"	1-1/4"	1-1/2"	2"
10	360	680	1400	2100	3950
20	250	465	950	1460	2750
30	200	375	770	1180	2200
40	170	320	660	990	1900
50	151	285	580	900	1680
60	138	260	530	810	1520
70	125	240	490	750	1400
80	118	220	460	690	1300
90	110	205	430	650	1220
100	103	195	400	620	1150
150	84	160	325	500	950
200	72	135	280	430	800

Venting:

This machine is to be used indoors and requires ventilation.

When venting the machine, if the machine is to be in an enclosed area with a vent pipe, be sure it is the same size as the stack on the machine. Poor draft will cause the machine to soot and not operate efficiently. When placing the machine for installation, position the vent pipe to be as straight as possible and to protrude through the roof of the building at a proper location and at sufficient height to eliminate down-draft. Venting of a gas fired machine shall be installed with a down-draft diverter located about 3 ft. above machine.

Input - BTU Per Hour	Draft Hood & Flue Pipe Size
250,000 - 320,000	8 inch
320,000 - 410,000	9 inch
410,000 - 600,000	10 inch
600,000 - 750,000	12 inch

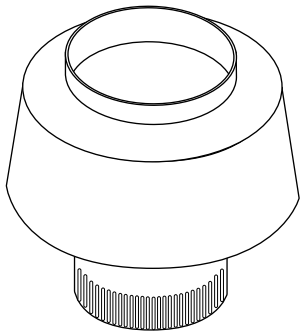
NOTE: If the vent pipe exceeds 10 ft. in length, or contains more than two elbows, use next size larger pipe and draft diverter or the burner will not ignite. No movable vent pipe damper should be used on any installation.

Draft Diverter:

Install the draft diverter above the heating coil. The diverter enhances the draft through the burner by severing the chimney effect created in sections of vent pipe positioned below. It also helps prevent freezing of the coil due to wind chill factors.

Figure 3

Optional



When in a tightly closed room without ventilation openings to the outdoors or other rooms, provisions shall be made for supplying air for combustion through special openings, one near the floor and the other near the ceiling, each to be sized on the basis of one square inch or more of free area for each 1,000 BTU input per hour (see Figure 4).

When a room is of unusually tight construction and has a ventilating fan, which may be used for exhausting air outdoors -or has a vented exhaust — it is recommended that combustion air be supplied to the enclosed room through intakes extending to the outside of the building and terminating in down-turned fittings. These should be suitably arranged to prevent obstruction from snow or rain, and include a protecting screen not smaller than 1/4 inch mesh.

Figure 4

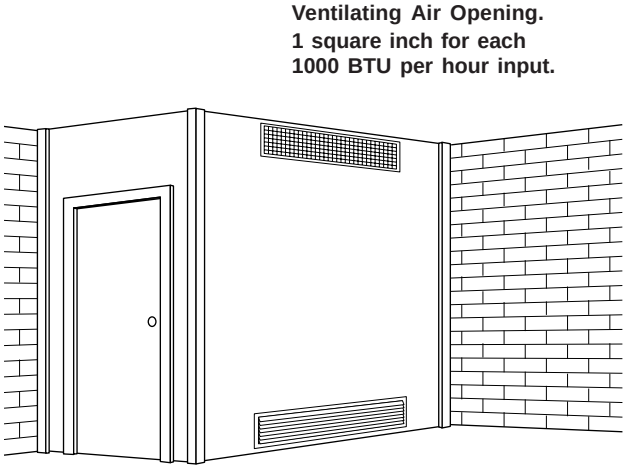


Illustration showing air openings necessary to supply air for combustion when installed in an enclosed room.

Water Source:

The water source for the machine should be supplied by a 5/8" I.D. garden hose with a city water pressure of not less than 30 PSI. If the water supply is inadequate, or if the garden hose is kinked, the machine will run very rough and the burner will not fire.

Water Connection:

Connect the high pressure hose by pulling the coupler collar back and then inserting it onto the discharge nipple. Secure it by pushing the collar forward.

Attach the wand into the spray gun using teflon tape on the pipe threads to avoid leaks.

Inspection and Testing Gas Piping:

The building structure should not be weakened by installing the gas piping. The piping should not be supported by other piping, but should be firmly supported with gas hooks, straps, bands or hangers. Butt or lap welded pipe should not be run through or in an air duct or clothes chute.

INSTALLATION

Before turning gas under pressure into piping, all openings from which gas can escape should be closed. Immediately after turning on gas, the system should be checked for leaks. This can be done by watching the 1/2 cubic foot test dial for 5 minutes for any movement or by soaping each pipe connection and watching for bubbles. If a leak is found, make the necessary repairs and repeat the above test.

Defective pipes or fittings should be replaced and not repaired. Never use a flame or fire in any form to locate gas leaks — use a soap solution.

After the piping and meter have been checked completely, purge the system of air. **DO NOT** bleed the air inside an enclosed room.

During pressure testing of the system at test pressures in excess of 1/2 PSIG, the appliance and its individual shut-off valve must be disconnected from the gas supply piping system or damage to the gas valve will occur.

FOR YOUR SAFETY READ BEFORE LIGHTING

WARNING

If you do not follow these instructions exactly, a fire or explosion may result, causing property damage, personal injury or loss of life.

A. This appliance has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.

B. BEFORE LIGHTING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

FOR YOUR SAFETY
"WHAT TO DO IF YOU SMELL GAS"

- Do not try to light any appliance.
- Do not touch any electrical switch, do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your supplier, call the fire department.

C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it; call a qualified service technician. Forced or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

Gas Pressure:

The ideal incoming gas pressure is 11 water column inches or w.c.i. (min. 6 wc", max. 14 wc" or 1/2 PSIG). The correct operating manifold pressure for natural gas is 3.5 wc" The operating manifold pressure for propane gas is 10 wc" By adjusting the gas valve pressure regulator between 3 and 4 wc" a side range can be achieved for natural gas. Propane is 6-10 wc".

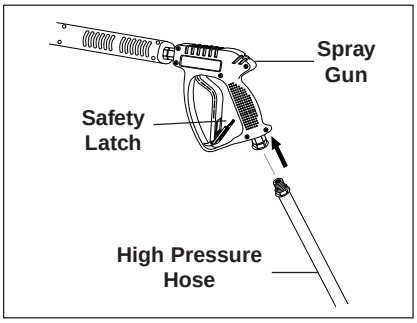
If the desired input rating cannot be obtained within the above manifold pressure adjusting range, then the next size larger or smaller burner orifice should be used.

CHECK LIST BEFORE STARTING:

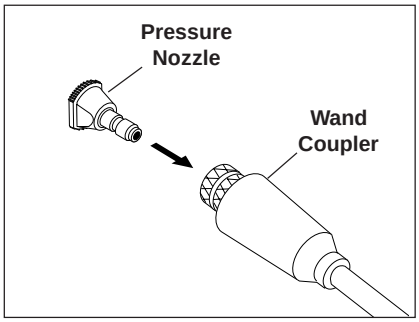
CAUTION! If "NO" is checked on any of the following sixteen questions, do not operate this machine.

	YES	NO
Has gas supply been inspected by an authorized contractor to meet local codes?		
Is machine protected from downdraft and excessive wind?		
Is machine shielded from moisture or water spray?		
Is the voltage correct and are the circuit breaker and supply cord adequate according to specifications and serial plate notation?		
Is the machine electrically grounded?		
Is there ample water supply?		
Have all flammable liquids or gases been removed from installation location?		
Is there adequate gas supply for the BTU rating of the burner?		
Is incoming gas supply pressure between 6 - 14 water column inches or 1/2 PSIG?		
Has the proper gas regulator been installed for pressure and volume?		
Is the machine properly vented to allow adequate air flow?		
Are the propane tanks large enough, according to rating to prevent freezing (vapor propane machines only)?		
Have gas lines been checked for gas leaks?		
Have gas lines been checked with local codes?		
Have all operators using this machine been instructed properly & have they read the manual?		
Has the machine been installed according to operator's manual instructions?		

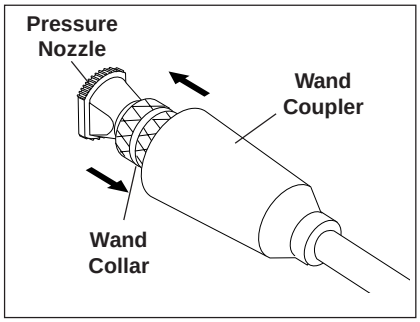
ASSEMBLY INSTRUCTIONS



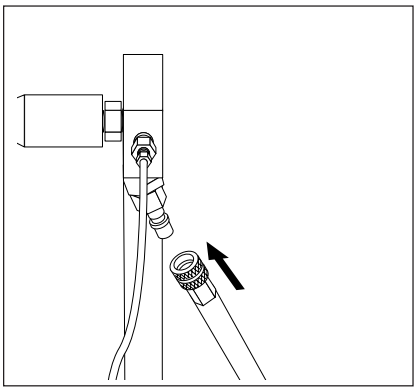
STEP 1: Attach the high pressure hose to the spray gun using teflon tape on hose threads.



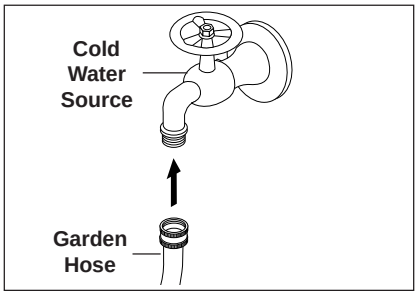
STEP 2: Pull the spring-loaded collar of the wand coupler back to insert your choice of pressure nozzle. ***CAUTION: Never replace nozzles without engaging the safety latch on the spray gun trigger.***



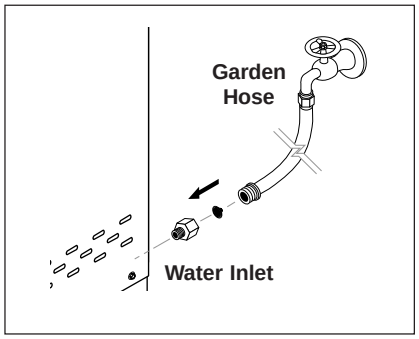
STEP 3: Release the coupler collar and push the nozzle until the collar clicks. Pull the nozzle to make sure it is seated properly.



STEP 4: Connect the high pressure hose to the pump discharge fitting. Push coupler collar forward until secure.

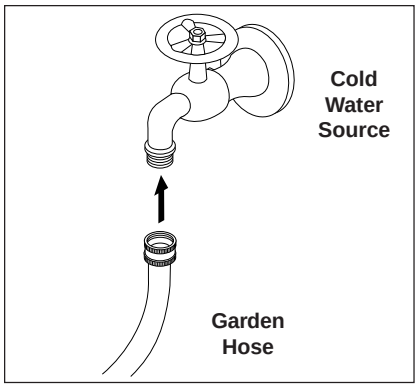


STEP 5: Connect garden hose to the cold water source.

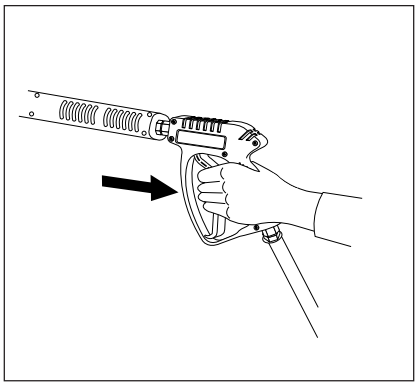


STEP 6: Check inlet filters, remove debris, then connect the garden hose to pump water inlet. ***CAUTION: Do not run the pump without water or pump damage will result.***

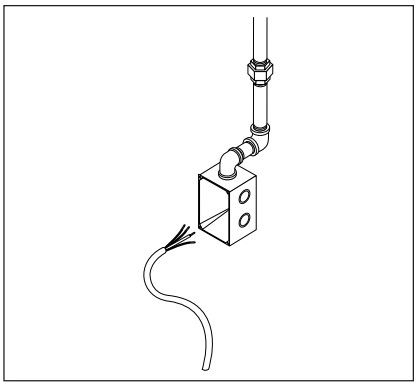
OPERATING INSTRUCTIONS



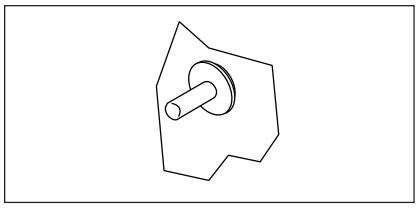
STEP 1: Review installation instructions prior to connecting garden hose to the cold water source and turn water on completely. **Never use hot water.**



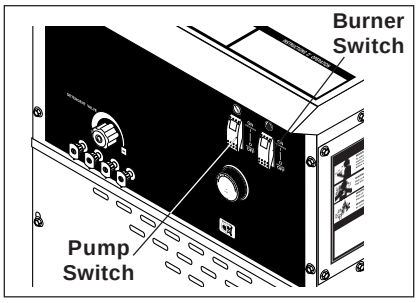
STEP 2: Trigger the spray gun to eliminate trapped air then wait for a steady flow of water to emerge from the spray nozzle.



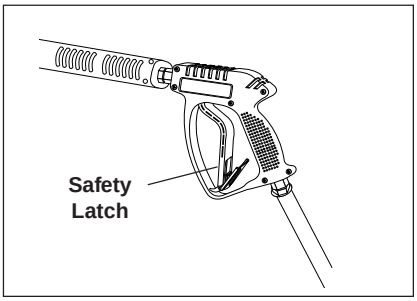
STEP 3: Have an electrician connect power supply into junction box according to information shown on the serial plate before turning gas valve dial to "PILOT" position.



STEP 4: Depress control knob and hold it in. After 5 seconds, depress the red ignitor until you hear a loud click. Repeat 3 or 4 times if necessary until pilot is lit. If pilot does not remain lit, repeat operation, allowing a longer period of time before releasing the knob. After the pilot lights, continue to hold the control knob down for 1 minute. **Note**: Sufficient time must be allowed for a proper size pilot flame to heat the thermocouple and hold the safety magnet in a locked-up position.

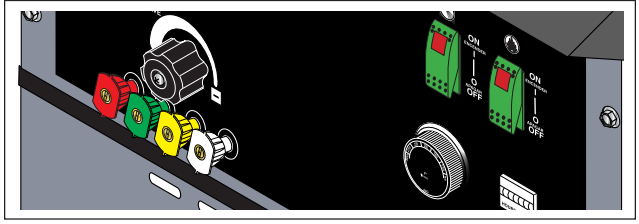


STEP 5: Turn gas cock dial (located on rear of machine) to "PILOT" position. Release dial and turn to full ON. Push pump switch ON, or turn to pump position and pull the trigger on the spray gun allowing cold water to flow. To activate the gas control valve for hot water, push the burner switch to the ON position and pull the trigger on the spray gun.



⚠ **WARNING! Never replace nozzles without engaging the safety latch on the spray gun trigger.**

NOZZLES



The five color-coded quick connect nozzles provide a wide array of spray widths from 0° to 45° and are easily accessible when placed in the convenient rubber nozzle holder, which is provided on the front of the machine.

NOTE: For a more gentle rinse, select the white 40° or green 25° nozzle. To scour the surface, select the yellow 15° or red 0° nozzle. To apply detergent select the black nozzle.

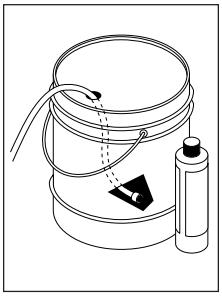
AUTO IGNITION OPTION

If your machine has Auto Ignition option, follow these steps.

1. Have electrician connect power supply into junction box according to information shown on serial plate and open main gas supply.
2. Push pump switch to "ON" position, pull trigger on spray gun.
3. After water and pressure is exiting pressure nozzle push burner switch "ON". **Note:** Thermostat should be set at 200°.
4. The pilot will ignite first then you will notice a flash of light indicating complete ignition. **Note:** You should hear a clicking sound before the pilot ignites.

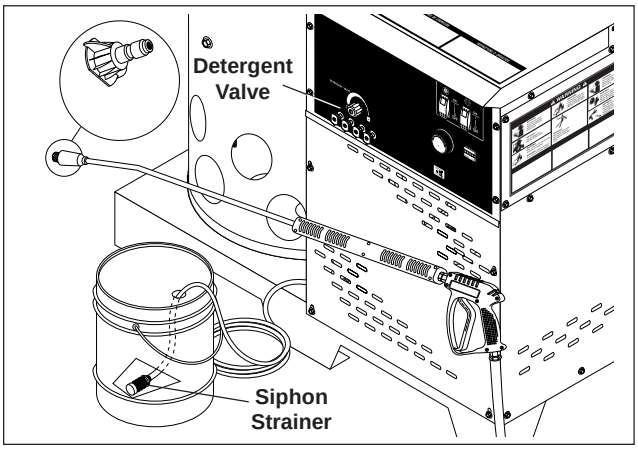
DETERGENTS & GENERAL CLEANING TECHNIQUES

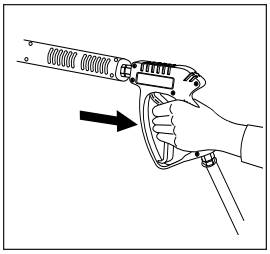
WARNING: Some detergents may be harmful if inhaled or ingested, causing severe nausea, fainting or poisoning. The harmful elements may cause property damage or severe injury.



STEP 1: Use detergent designed specifically for pressure washers. Household detergents could damage the pump. Prepare detergent solution as required by the manufacturer. Fill a container with pressure washer detergent.

STEP 2: Place siphon tube strainer into detergent container open detergent valve. Place the filter end of detergent suction tube into the detergent container.





STEP 3: Pull trigger to operate machine. Liquid detergent is drawn into the machine and mixed with water. Apply detergent to work area. Do not allow detergent to dry on surface. Follow operating instructions.

IMPORTANT: You must flush the detergent siphoning system after each use by placing the suction tube into a bucket of clean water, then run the pressure washer for 1-2 minutes.

THERMAL PUMP PROTECTION

If you run your pressure washer for 3-5 minutes without pressing the trigger on the spray gun, circulating water in the pump can reach high temperatures. When the water reaches this temperature, the pump protector engages and cools the pump by discharging the warm water onto the ground. This thermal device prevents internal damage to the pump.

CLEANING TIPS

Pre-rinse cleaning surface with fresh water. Place detergent suction tube directly into cleaning solution and apply to surface at low pressure (for best results, limit your work area to sections approximately 6 feet square and always apply detergent from bottom to top). Allow detergent to remain on surface 1-3 minutes. Do not allow detergent to dry on surface. If surface appears to be drying, simply wet down surface with fresh water. If needed, use brush to remove stubborn dirt. Rinse at high pressure from top to bottom in an even sweeping motion keeping the spray nozzle approximately 1 foot from cleaning surface. Use overlapping strokes as you clean and rinse any surface. For best surface cleaning action spray at a slight angle.

Recommendations:

- Before cleaning any surface, an inconspicuous area should be cleaned to test spray pattern and distance for maximum cleaning results.
- If painted surfaces are peeling or chipping, use extreme caution as pressure washer may remove the loose paint from the surface.
- Keep the spray nozzle a safe distance from the surface you plan to clean. High pressure wash a small area, then check the surface for damage. If no damage is found, continue to pressure washing.

CAUTION - Never use:

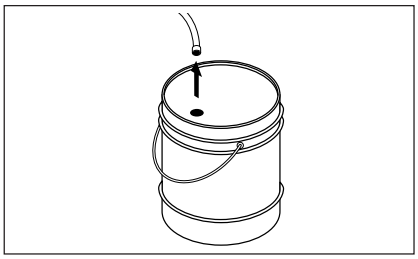
- Bleach, chlorine products and other corrosive chemicals
- Liquids containing solvents (i.e., paint thinners, gasoline, oils)
- Tri-sodium phosphate products
- Ammonia products
- Acid-based products

These chemicals will harm the machine and will damage the surface being cleaned.

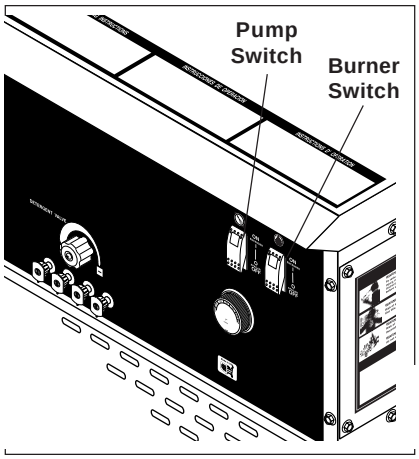
RINSING

It will take a few seconds for the detergent to clear. Apply safety latch to spray gun. Select and install desired high pressure nozzle. **NOTE:** You can also stop detergent from flowing by removing detergent siphon tube from bottle.

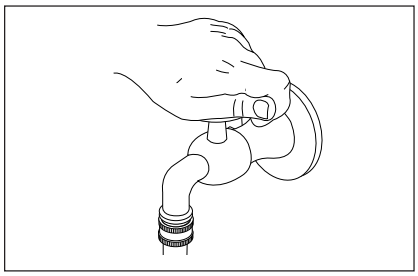
SHUTTING DOWN AND CLEAN-UP



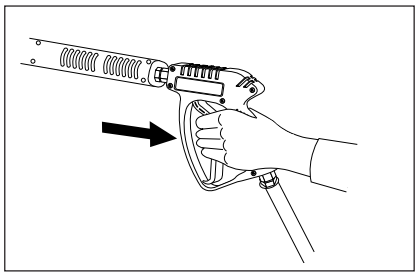
STEP 1: Remove detergent suction tube from container and insert into one gallon of fresh clean water. Pull trigger on spray gun and siphon water for one minute.



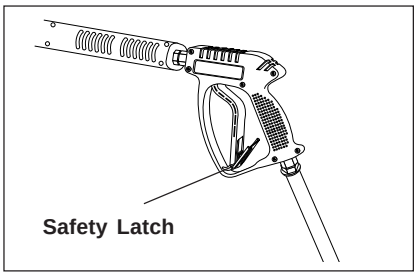
STEP 2: Turn/push burner switch to "OFF" position. Open spray gun allowing water to cool. Then turn/push pump switch to “OFF” position.



STEP 3: Turn off water supply.



STEP 4: Press trigger to release water pressure.



STEP 5: Engage the spray gun safety lock.

STORAGE

CAUTION: Always store your pressure washer in a location where the temperature will not fall below 32°F (0°C). The pump in this machine is susceptible to permanent damage if frozen. FREEZE DAMAGE IS NOT COVERED BY WARRANTY.

1. Stop the pressure washer, squeeze spray gun trigger to release pressure.
2. Detach water supply hose and high pressure hose.
3. Turn on the machine for a few seconds, until remaining water exits. Turn off immediately.
4. Do not allow high pressure hose to become kinked.
5. Store the machine and accessories in a room which does not reach freezing temperatures.

CAUTION: Failure to follow the above directions will result in damage to your pressure washer.

BASIC FACTS

Based on 60º		Propane	Butane
1 Cu. Ft. NG Approx 1,000 BTU			
Formula		C3H8	C4H10
Vaporization Point (ºF)		-43.7	31.1
Specific Gravity (Vapor)		1.522	2.006
Specific Gravity (Liquid)		0.508	0.584
Lbs. per Gal. (Liquid)		4.23	4.87
BTU per Cu. Ft. (Vapor)		2.563	3.39
BTU per Gal. (Liquid)		91.547	102.032
BTU per Lb. (Liquid)		21.591	21.221
Cu. Ft. per Lb. (Liquid)		8.607	6.53
Cu. Ft. per Gal. (Liquid)		36.45	31.8
Octane Number		125	91
Molecular Weight		44.09	58.12
To Calculate Running Cost:	1,000 BTU = 1 Cu. Ft.		
	100 Cu. Ft. = 1 Therm		
	1 Therm = 1 Hour		
	Cost of Gas per Therm = Cost to Run		
Example Using Natural Gas at 50¢ Therm:	400,000 BTU Machine		
	400 Cu. Ft. *(400,000 / 1,000)*		
	4 x 50¢ = $2.00 / Hour to Run *((400 / 100) x cost of gas)*		

PRESSURE EQUIVALENTS

Simply stated, pressure is the force exerted by a gas or liquid attempting to escape from a container. It is useful to know how strong this "attempt to escape" is. Pressure can be measured with a manometer or with a pressure gauge. At the lower levels, it is expressed in "water column inches" i.e. 11 w.c.i. Higher pressures are expressed in terms of the force exerted against a square inch of area, for example, 125 lbs. per square inch (125 psi).

1 water column inch	=	50 oz./sq. in.	11 water column inches	=	6.35 oz./sq. in.
11 water column inches	=	4 lb./sq. in.	1 lb./sq. in.	=	27.71 water column inches
1 lb./sq. in.	=	2.04" Mercury	1" Mercury	=	.39 lb./sq. in
1 Std. Atmosphere	=	14.73 lbs./sq. in.			

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
NO SPARK - NO PILOT GAS	No main power	Restore power.
	Faulty limit switch	Test/replace.
	Faulty wiring	Test wiring.
SPARK - BUT NO PILOT LIGHT	No gas supplied to pilot valve	Check for availability of gas.
	Manual valves in "OFF" position	Turn manual valve and gas cock to full "ON". Check pilot key adjustment.
	Faulty pilot valve	Test gas valve.
	Faulty wiring	Test wiring.
	Restricted pilot line or clogged pilot orifice	Clean pilot tubing and orifices.
PILOT GAS - BUT NO SPARK	Broken or shorted electrode assembly	Test/replace.
PILOT LIT - BUT MAIN BURNER WON'T COME ON	Faulty wiring	Test wiring.
	Low pilot flame	Check inlet pressure, pilot oriface.
	Improper alignment of sensor in pilot flame	Adjust alignment - see figure 7, page 14.
	Faulty main gas operator in gas control	Test gas valve - repair/replace.
	Faulty flame sensor	Test sensor, wiring - repair/replace.
PILOT CYCLES OFF AND ON BY ITSELF	Faulty pilot valve	Test gas valve.
	Faulty wiring	Test wiring.
MAIN BURNER SHUTS DOWN	Low pilot flame	Check inlet pressure, pilot oriface.
	Improper alignment of sensor in pilot flame	Adjust alignment - see figure 7, page 14.
	Faulty main gas operator in gas control	Test gas valve - repair/replace.
	Faulty flame sensor	Test sensor, wiring - repair/replace.
LOW OPERATING PRESSURE	Faulty pressure gauge	Install new gauge.
	Insufficient water supply	Use larger garden hose. Clean filter washer at water inlet.
	Old, worn or incorrect spray nozzle	Match nozzle number to machine and/or replace with new nozzle.
	Belt slippage	Tighten or replace. Use correct belt.
	Plumbing or hose leak	Check plumbing system for leaks. Retape leaks with teflon tape.
	Faulty or misadjusted unloader valve (where applicable)	Adjust unloader for proper pressure. Install repair kit when needed.
	Worn packing in pump	Install new packing kit.
	Fouled or dirty inlet or discharge valves in pump	Clean inlet and discharge valve.
	Worn inlet or discharge valves	Replace with valve kit.
	Obstruction in spray nozzle	Remove obstruction.
	Leaking pressure control valve (where applicable)	Rebuild or replace as needed.
	Detergent metering valve left open sucking air or faulty metering valve	Close and/or replace metering valve.
	Slow motor RPM	Check incoming voltage.
LOW WATER TEMPERATURE	Improper size of gas lines	See page 7 for sizing of gas lines.
	Low gas pressure	Increase gas pressure to machine.
	Improper pressure regulator	Specify BTU, building gas pressure 11 w.c.i. to machine for correct sizing of regulator.
	Low gas pressure	Increase gas pressure as described on page 8.
	Soot buildup on coils not allowing heat transfer	Clean coils.
	Improper burner nozzle	See serial plate.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
WATER TEMPERATURE TOO HOT	Incoming water to machine warm or hot	Lower incoming water temperature.
	Gas pressure too high	See page 10 for specifications for proper gas pressure.
	Detergent line sucking air	Tighten all clamps. Check detergent lines for holes.
	Defective high limit switch	Replace.
	Incorrect burner nozzle size	See serial plate.
	Insufficient water supplied	Check water GPM to machine.
	Restricted water flow	Check nozzle for obstruction, proper size.
PRESENCE OF WATER IN OIL	Oil seal worn	Check and replace if necessary.
	High humidity in air	Check and change oil twice as often.
WATER DRIPPING FROM UNDER PUMP	Piston packing worn	Check and replace if necessary.
	O-Ring plunger retainer worn	Check and replace if necessary.
DETERGENT NOT DRAWING	Air leak	Tighten all clamps. Check detergent lines for holes.
	Detergent metering valve packing not tight or packing worn	Tighten nut. Replace valve or packing.
	Filter screen on detergent suction hose plugged	Clean or replace.
	Dried up detergent plugging metering valve	Disassemble and clean thoroughly.
	High viscosity of detergent	Dilute detergent to specifications.
	Restriction behind float tank screen removed	Install restriction.
	Hole in detergent line(s)	Repair hole.
	Strainer basket plugged	Remove and clean.
	Connections on selector valve loose	Put teflon tape on all pipe connections.
	Detergent solenoid not opening (where applicable)	Check flow switch, replace detergent solenoid.
PUMP RUNNING NORMALLY BUT PRESSURE LOW ON INSTALLATION	Pump sucking air	Check water supply and possibility of air seepage.
	Valves sticking	Check and clean or replace if necessary.
	Unloader valve seat faulty	Check and replace if necessary.
	Nozzle incorrectly sized	Check and replace if necessary (See serial plate for proper size).
	Worn piston packing	Check and replace if necessary.
FLUCTUATING PRESSURE	Valves worn	Check and replace if necessary.
	Blockage in valve	Check and replace if necessary.
	Pump sucking air	Check water supply and air seepage at joints in suction line.
	Worn piston packing	Check and replace if necessary.
PUMP NOISY	Air in suction line	Check water supply and connections on suction line.
	Broken or weak inlet or discharge valve springs	Check and replace if necessary.
	Excessive matter in valves	Check and clean if necessary.
	Worn bearings	Check and replace if necessary.
OIL DRIPPING	Oil seal worn	Check and replace if necessary.
EXCESSIVE VIBRATION IN DELIVERY LINE RELIEF VALVE LEAKS WATER	Irregular functioning of the valves	Check and replace if necessary.
	Relief valve defective	Replace or repair.

MAINTENANCE & SERVICE

Spray Nozzles:

Each machine is equipped with one or more spray nozzles, depending on the model. Different spray nozzles are calibrated for each machine, depending on the flow and pressure of that particular model. Spray nozzles vary in bore size and angle of spray. Popular spray angles are 0°, 15°, 25°, 40°. When ordering, please specify size and angle of nozzle. Nozzle size for each machine is located on the serial plate.

Unloader Valves:

Unloader valves relieve pressure in the line when a spray gun is closed. Unloader valves are preset and tested at the factory before shipping. Occasional adjustment of the unloader may be necessary to maintain correct pressure. For valve adjustment contact your nearest dealer or call technical support.

Winterizing Procedure:

Damage due to freezing is not covered by warranty. Adhere to the following cold weather procedures whenever the washer must be stored or operated outdoors under freezing conditions.

It is necessary to protect your machine against freezing when temperatures drop below 32° F. Siphoning a small amount of antifreeze into the system is recommended. This is done by pouring a 50-50 mix of antifreeze and water into the float tank and then siphoning 100% antifreeze through the detergent line with the pump on. If compressed air is available, an air fitting can be screwed into the float tank strainer fitting, and by injecting compressed air, all water will be blown out of the system. The use of a draft diverter will prevent the wind chill factor from freezing the coil.

Low Pressure Diagnosis:

(Machines with spray gun)

Refer to Troubleshooting Chart for low pressure. If the trouble is found to be either the unloader or the pump, your next step is to determine which is the problem. This can be done by eliminating the unloader from the system and attaching the 50' discharge hose directly to the pump. If high pressure is developed in this manner, the pump is good and the unloader needs to be repaired or replaced. If low pressure is still present, then the pump needs repairing.

CAUTION: When using this procedure to test components keep the spray gun open at all times.

High Limit Hot Water Thermostat:

For safety, each machine is equipped with an adjustable thermostat. In the event the temperature of the water should exceed its operating temperature, the thermostat will turn the burner off until the water cools.

Pumps:

Use only SAE30 weight non-detergent oil. Change oil after first 50 hours of use. Thereafter, change oil every three months or at 500 hour intervals. Oil level should be checked through use of the dipstick found on the top of the pump or by the red dot visible through the oil gauge window. Oil should be maintained at that level.

HEATING COILS

To Check Water Heater Coil for Leaks:

With the main burners "OFF" start the pumping unit and allow it to run for a few minutes. With a drop light or flashlight, check the burner compartment. If no leaks are visible and water is dripping from the coils, then it is condensation from the flue gases when the burners are on.

Condensation from Heating Coil:

When cold water is being pumped into the water heater coils and the burners are on, condensation will form on the coils and drip down into the burner compartment. This will give the appearance of a leaking coil, particularly on cold humid days.

Deliming Coils:

In alkaline water areas, lime deposits can accumulate rapidly inside the coil pipes. This growth is increased by the extreme heat build up in the coil. The best prevention for liming conditions is to use high quality cleaning detergents. In areas where alkaline water is an extreme problem, periodic use of Manufacturers Deliming Powder (part #9-028008) will remove lime and other deposits before coil becomes plugged. (See following Instructions for use of Deliming Powder.)

Periodic flushing of coils is recommended.

1. Fill a container with 4 gallons of water, then add 1 lb. of deliming powder. Mix thoroughly.
2. Remove nozzle from spray gun assembly and put spray gun into container. Secure the trigger on the spray gun into the open position.
3. Attach a short section (3-5 ft.) of garden hose to machine to siphon solution from an elevated container, or add mixture to the float tank. Turn pump switch on allowing solution to be pumped through coils and back into the container. Solution should be allowed to circulate 2-4 hours.
4. After circulating solution, flush entire system with fresh water. Reinstall wand assembly to spray gun.

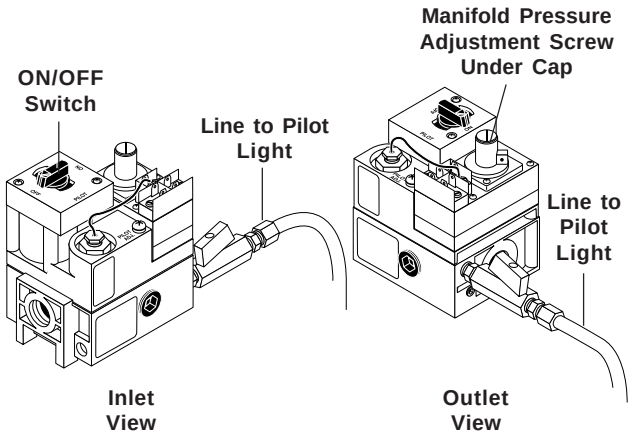
Gas Valve Regulator Adjustment:

(See Fig. 5)

Adjustment of the built-in regulator isn't normally necessary, since it is preset at the factory. However, field adjustment may be accomplished as follows:

1. Attach manometer at both inlet and outlet pressure ports.
2. Remove manifold pressure adjustment screw cap.
3. With small screwdriver, rotate manifold pressure adjustment screw clockwise to increase or counterclockwise to decrease gas pressure.
4. Replace manifold pressure adjustment screw cap.

Figure 5



Gas Valve Adjustment

Pilot Burner Adjustment:

1. Remove pilot adjustment cap.
2. Adjust pilot key to provide properly sized flame.
3. Replace pilot adjustment cap.

Rupture Disk:

If pressure from pump or if thermal expansion should exceed safe limits, the rupture disk will burst, allowing high pressure to be discharged through hose to ground. When the disk ruptures, it will need to be replaced. Torque to 35 ft. lbs.

PROPANE GAS (Vapor Fuel Only)

General Safety Precautions:

Have a qualified gas service person assist in any gas burner installation or service. Few maintenance people or mechanics are knowledgeable in gas controls or related safety practices. Since propane gas is heavier than air, unburned propane gas will gravitate to the floor rather than rise out of the stack. Hence, adequate floor space and good ventilation are especially important with propane systems.

Gas Pressure Requirements:

All propane fired machines operate on gas phase only. They are designed to operate at a pressure of 11 w.c.i. (between 1/3 and 1/2 of one PSI), and are often operated at even higher pressures when extra heat is needed.

Exterior regulators are needed to control the system. Propane bottles are not included with the machine. A high pressure regulator should be installed on the propane bottle and a low pressure regulator attached to the pressure washer.

Propane Cylinder Capacity:

An important consideration with propane systems is the capacity of the supply cylinder relative to the needs of the burner. The burner operates on propane as a gas. As gas is used from the propane cylinder, the liquid in the cylinder boils to maintain gas pressure. This boiling process cools the liquid, and in a heavy, continuous-demand situation, the liquid temperature can fall to the point at which it cannot provide gas as rapidly as is needed. In this case, it may be necessary to warm the propane cylinder by directing a warm spray, not over 120°, on the cold cylinder, or by manifolding two propane bottles together to increase total vaporization capacity. It is recommended that a minimum 100 lb. propane bottle be used on the machine, depending on the length of running time desired.

BURNER FEATURES

Operated Automatic Valve:

This machine is equipped with a thermopile self-powered combination gas control. This system is designed as a constant burning pilot. Lighting of the pilot is accomplished by manually lighting the pilot. A thermostat and flow switch control the main solenoid valve.

Care of Main Burner:

Because of condensation from the heater coils dripping down on the burners, scale buildup may occur in the burner jet orifices.

1. **TO REMOVE BURNER MANIFOLD FROM WATER HEATER COIL:**

   Turn off the gas at the main burner by turning the knob to the "OFF" position on the gas valve and main gas supply.

   Disconnect the pilot and ignition lines from the gas valve. Disconnect union in main burner line. (Remove the nuts from the U-bolts, item 21 on page 32). Slide burner manifold out through shell opening.

MAINTENANCE & SERVICE

2. **TO CLEAN BURNER JETS:**

   Select proper size drill for type of gas involved. Use vise to hold drill and to ream out each jet orifice.

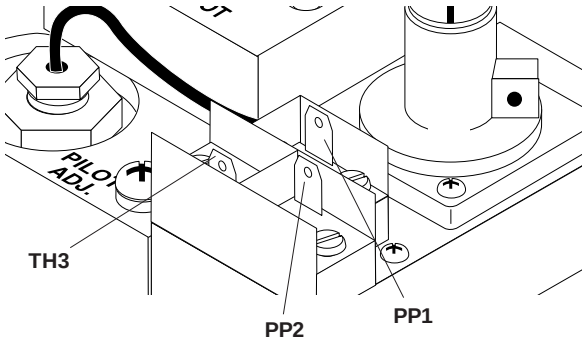
If the water heater will be exposed to freezing weather, an antifreeze solution should be circulated through the coils by whatever means are available for the particular system the water heater is used on.

BURNER TROUBLESHOOTING

Millivolt System Check:

This machine has a thermopile self-powered combination gas control. Before checking the millivolt system, the following operations should be performed and observations made:

1. Inspect system for proper wiring.
2. The switch leads and all wire connections should be cleaned and tightened to eliminate all unnecessary resistance.
3. Clean and/or adjust pilot for maximum flame impingement on the thermopile.
4. If pilot will not remain lit when gas cock dial is released, check automatic pilot (Step D).



Check Test	To Test	Connect Meter Leads To Terminals	Switch Flow & Burner Contacts	Meter Reading Should Be
A	Complete System	2 & 3	Closed	100 MV or More
B	Thermopile Output	1 & 2	Open	Greater than 250
C	System Resistance	1 & 3	Closed	Less than 35
D	Auto/Pilot Dropout	1 & 2	Open	Between 120 - 30 MV

The millivolt system and individual components may be checked with a DC millivolt meter having a 0-1000 MV range. Conduct each check as shown in the chart below by connecting the meter test leads to terminals as indicated. All readings are closed circuit.

A. Complete Millivolt System Check

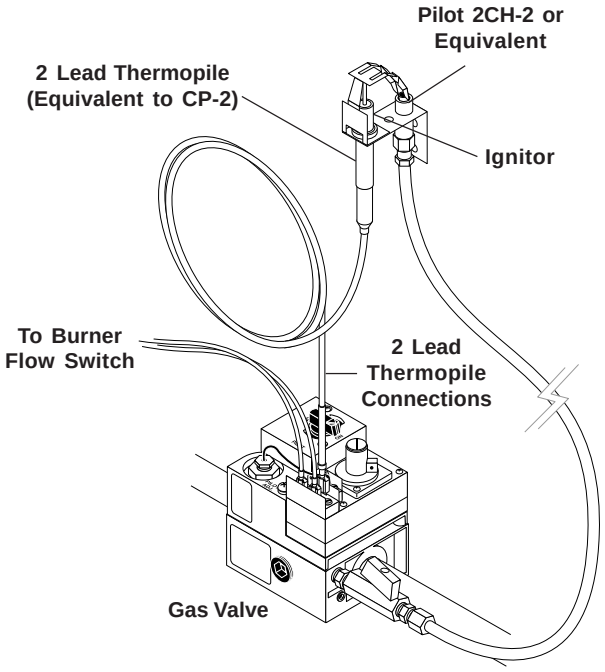
("A" Reading = Switch contacts CLOSED - Gas Cock Dial "ON" - Main burner should come ON).

1. If the reading is more than 100 millivolts and the automatic valve still does not come on, replace the automatic valve operator.
2. If the closed circuit reading ("A" Reading) is less than 100 millivolts, determine cause for low reading - proceed as follows:

B. Thermopile Output Reading Check

("B" Reading = Switch contacts OPEN - Main burner OFF).

If the minimum 250 millivolt reading is not obtainable, readjust pilot for maximum millivolt output. If millivolt reading is still below minimum specified, replace thermopile.



C. System Resistance Check

("C" Reading = Switch contacts CLOSED - Gas Cock "ON" - Main burner should be ON)

If the "C" Reading is more than that specified for the system being checked, this indicates the resistance in the system is excessive and must be reduced. To correct:

a. Clean and tighten switch leads and connections.

b. Shorten switch lead wires and/or replace with heavier gauge wire.

c. Cycle switch rapidly to clean contacts.

D. Automatic Pilot Dropout Check

1. Hold gas cock dial depressed in pilot position until maximum output is observed. Then extinguish pilot and observe meter.
2. Dropout of automatic pilot magnet (sound should be audible) should occur between 120 millivolts and 30 millivolts. If dropout occurs outside these limits, change the automatic pilot magnet assembly.

PREVENTATIVE MAINTENANCE

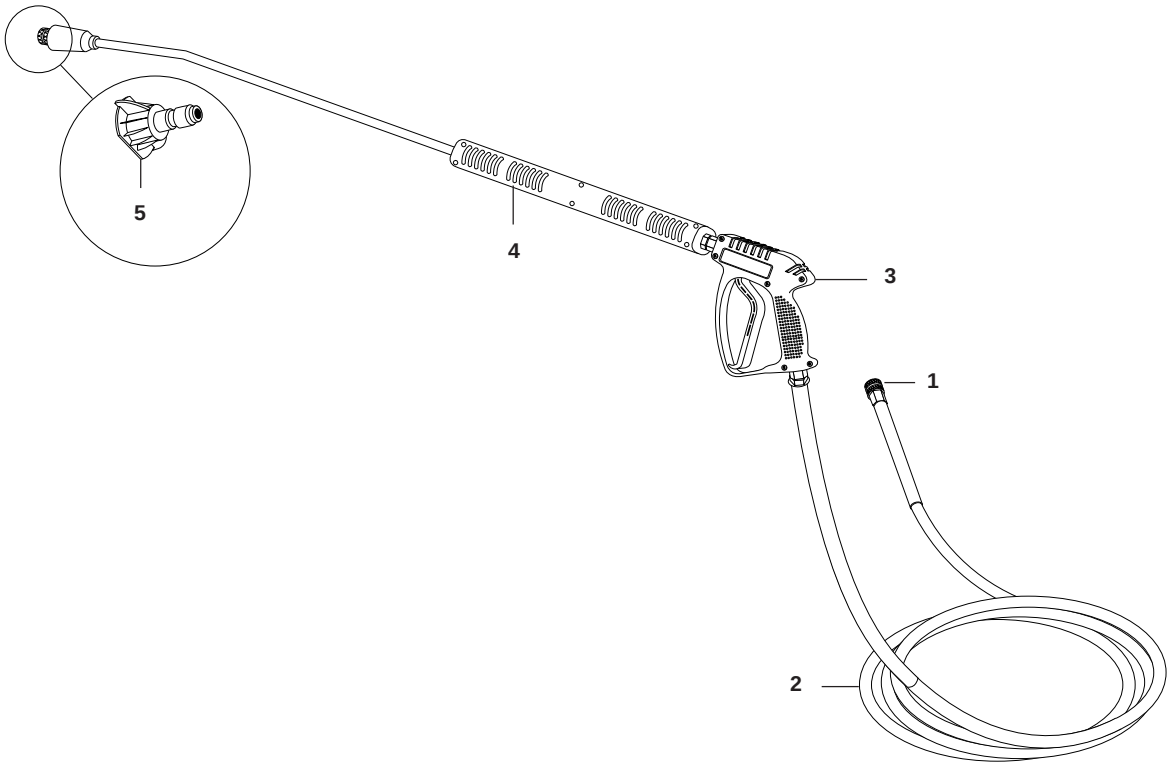
This pressure washer was produced with the best available materials and quality craftsmanship. However, you as the owner have certain responsibilities for the correct care of the equipment. Attention to regular preventative maintenance procedures will assist in preserving the performance of your equipment. Contact your dealer for maintenance. Regular preventative maintenance will add many hours to the life of your pressure washer. Perform maintenance more often under severe conditions.

MAINTENANCE SCHEDULE		
Replace Fuel Lines		Annually
Pump Oil	Inspect	Daily inspect the oil level
	Change	After first 50 hours, then every 500 hours or annually
Clean Burner Filter		Annually
Remove Burner Soot From Heating Coil		Annually
Check Belt Tension		Monthly
Descale Coil		Annually - (more often if required)
Replace High Pressure Nozzle		Every 6 months
Replace Quick Connects		Annually
Clean Water and Detergent Screen/Filter		Weekly
Clean Float/Supply Tank		Every 6 months
Replace HP Hose		If there is any sign of wear
Grease Motor		Every 10,000 hours
Check Burner Pilot Jets		Annually
Pressure Relief Valve		Annually

OIL CHANGE RECORD

Date Oil Changed Month/Day/Year	Estimated Operating Hours Since Last Oil Change

HOSE & SPRAY GUN ASSEMBLY

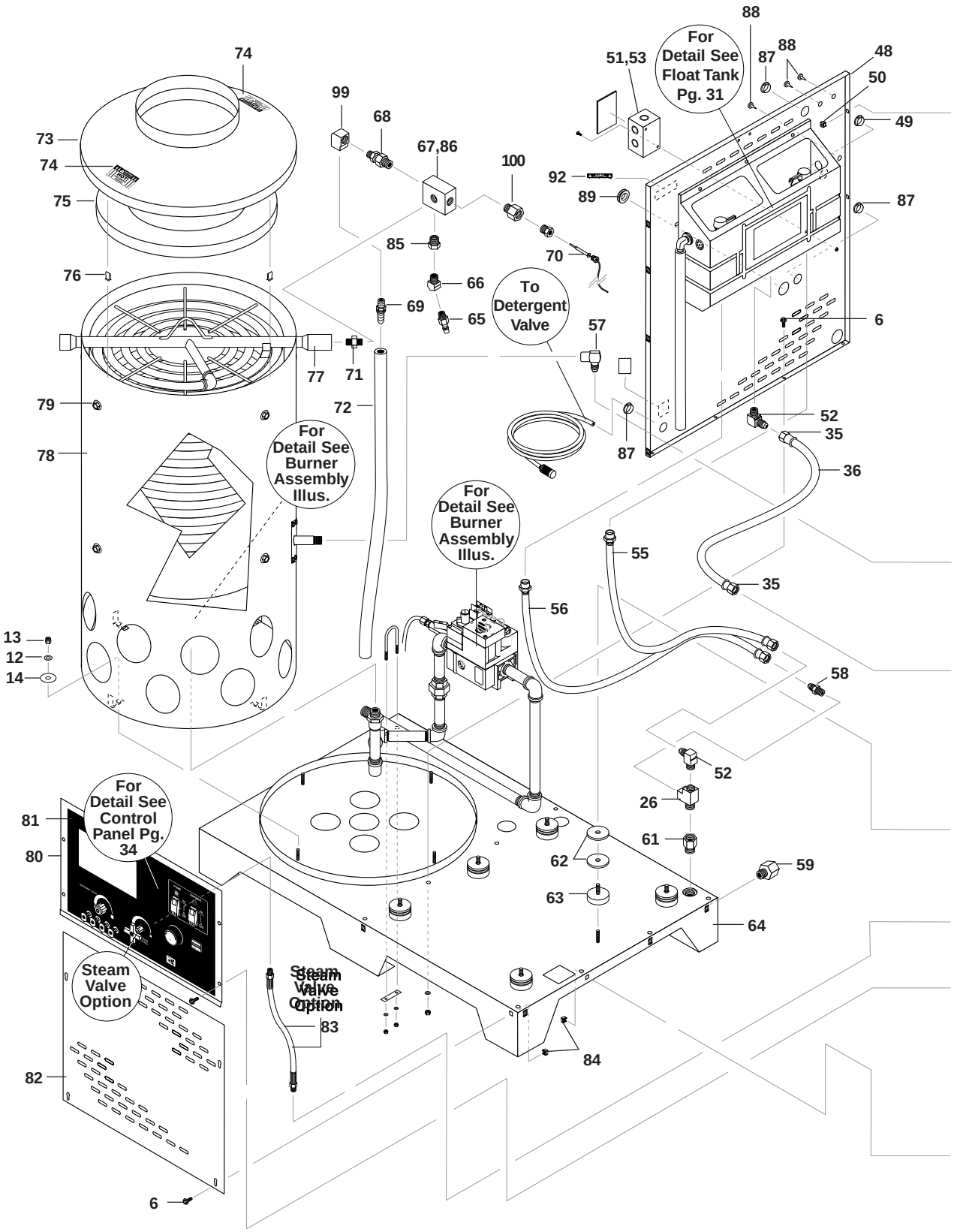


HOSE & SPRAY GUN PARTS LIST

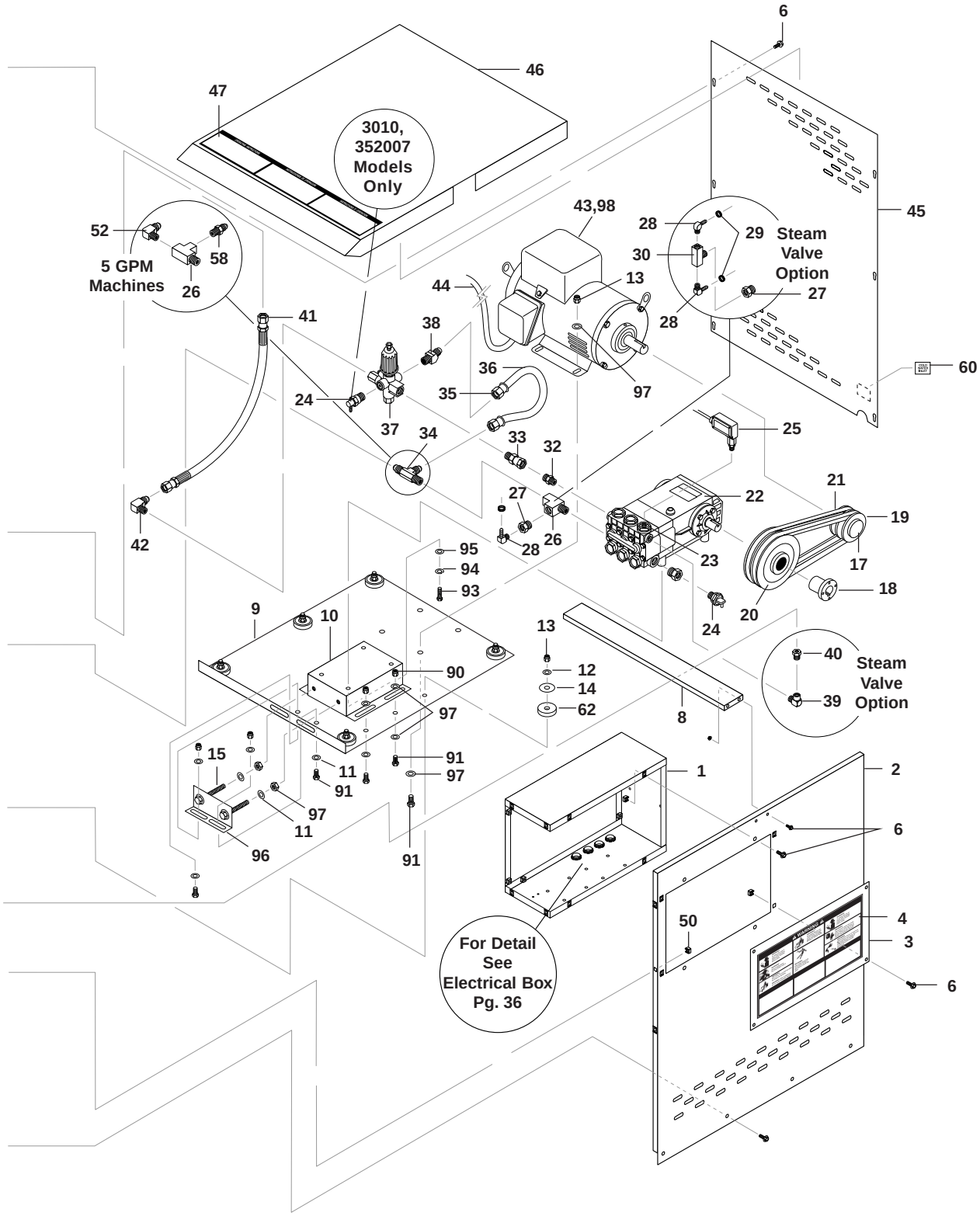
ITEM	PART NO.	DESCRIPTION	QTY
1	2-2002	Coupler, 3/8" Female	1
2	4-020650C	Hose, 3/8" x 50', 1 Wire Pressure Flex w/Coupler	1
	4-02093450BC	Hose, 3/8" x 50', 1 Wire Blue, w/Coupler	1
3	4-01246	Spray Gun, Shut-Off AP-1000	1
4	4-0111021	Lance, Spray, Insulated	1
5	4-12805500	Nozzle, SAQCMEG 0005.5 Red (5030, 3010, 4020)	1
	4-12805515	Nozzle, SAQCMEG 1505.5 Yellow (5030, 3010, 4020)	1
	4-12805525	Nozzle, SAQCMEG 2505.5 Green (5030, 3010, 4020)	1
	4-12805555	Nozzle, SAQCMEG 4005.5 White (5030, 3010, 4020)	1

ITEM	PART NO.	DESCRIPTION	QTY
5	4-12805000	Nozzle, SAQCMEG 0005 Red (3520)	1
	4-12805015	Nozzle, SAQCMEG 1505 Yellow (3520)	1
	4-12805025	Nozzle, SAQCMEG 2505 Green (3520)	1
	4-12805040	Nozzle, SAQCMEG 4005 White (3520)	1
	4-12807000	Nozzle, SAQMEG 0007 Red (5020)	1
	4-12807015	Nozzle, SAQMEG 1507 Yellow (5020)	1
	4-12807025	Nozzle, SAQMEG 2507 Green (5020)	1
	4-12807040	Nozzle, SAQMEG 4007 White (5020)	1
	4-12804000	Nozzle, SAQCMEG 0004 Red (3530)	1
	4-12804015	Nozzle, SAQCMEG 1504 Yellow (3530)	1
	4-12804025	Nozzle, SAQCMEG 2504 Green (3530)	1
	4-12804040	Nozzle, SAQCMEG 4004 White (3530)	1

EXPLODED VIEW



EXPLODED VIEW



EXPLODED VIEW PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	95-07163028	Box, Electrical	1
2	95-07163113	Panel, Front	1
3	95-07163114	Cover, E-Box Access	1
4	10-07994	Label, Warning	1
6	90-19711	Screw, 1/4" x 1/2" HH NC, Whiz Loc	42
8	95-07163119	Brace, Panel	1
9	95-071210136	Platform, Motor 3/16" (3520, 4020, 5020, 3530, 5030)	1
	95-07121013	Platform, Motor, 3 GPM (3010)	1
10	95-07121112	Rail, Pump or Generator Combo (301001, 3520, 4020, 5020, 3530, 5030)	1
	95-07163136	Rail, Pump, Legacy Pumps (301007)	1
11	90-2007	Nut, 3/8" Hex, NC	3
12	90-4002	Washer, 3/8" SAE, Flat	22
13	90-2002	Nut, 3/8" ESNA, NC	14
14	90-4007	Washer, 3/8" x 1-1/2", Fender, SAE	14
15	90-1025	Bolt, 3/8" x 5-1/2", Tap	2
16	90-2020	▲ Nut, Cage, 3/8" x 12 Gauge	8
17	Bushing, See Specifications Pages		
18	Bushing, See Specifications Pages		
19	Pulley, See Specifications Pages		
20	Pulley, See Specifications Pages		
21	Belt, See Specifications Pages		
22	Pump, See Specifications Pages		
23	1-190029	Cap, Valve, w/1/4" Gauge Port (301001, 352001, 402001, 353001, 502001, 503001)	1
	70-400146	Cap, Valve, w/1/4" Gauge Port, (402007, 502007, 353007, 503007)	1
	15-070042532	Cap, Valve w/1/4" Gauge Port (301007D, 352007A)	1
24	2-300816	Pump Protector, 3/8" PTP (3010, 352007)	1
	2-30082	Pump Protector, 1/2" (All except 301007, 301607, 352007)	1
25	6-021720	Switch, Pressure N/O, 1/4" NPT SS	1
26	2-1042	Tee, 1/2" Street	2
		(5 Gpm)	3
27	2-1076	Bushing, Reducer, 1/2" x 1/4"	1
28	2-1089	Hose Barb, 1/4" Barb x 1/4" Pipe, 90°	1
		(w/Steam Option)	2
29	2-9000	Clamp, Screw, #4	3

ITEM	PART NO.	DESCRIPTION	QTY
30	2-1037	Tee, 1/4" Branch Male (Steam Option)	1
32	2-0051	Nipple, 1/2" JIC, 3/8" Pipe	1
33	2-0079	Swivel, 1/2" JIC Female, 3/8" Male	1
34	2-10712	Tee, 1/2" x 1/2" JIC 51# (All except 5020, 5030)	1
35	2-1105	Swivel, 1/2" JIC Fem, Push-On (5020, 5030)	4
2	2-11050	Swivel, 3/4" SAE Fem, Push-On (5020, 5030)	2
36	4-02110000	Hose, 1/2", Push-On	3 ft.
	4-02120000	Hose, 3/4", Push-On (5020, 5030)	3 ft.
37	5-3208	Unloader, AL-VRT 607, 7.8 GPM @ 4200 PSI	1
38	2-106301	Elbow, 1/2" JIC x 3/8", 45°	1
39	2-0031	Elbow, 3/8", Street (Steam Option)	1
40	2-00682	Bushing, 3/8" x 1/4" Steel (Steam Option)	1
41	4-02047725	Hose, 3/8" x 25", 2 Wire, Pressure Loop	1
42	2-0053	Elbow, 1/2" JIC, 3/8", 90°	1
43	Motor, See Specifications Pages		
44	6-0104	Cord, Electric 12/3 SOWA (3010D, 3520A)	9.25 ft.
	6-0108	Cord, Service, SEO, 10/3 Coleman (4020A)	9.25 ft.
	6-0102	Cord, Service, SO, 8/3 Coleman (3530A, 5020A)	9.25 ft.
	6-0109	Cord, Service, SEO 10/4 (5020B, 3530B)	9.25 ft.
	6-01021	Cord, Service 8/4(5030B)	9.25 ft.
	6-0105	Cord, Service 12/4(3530C; 4020B,C; 5020C; 5030C)	9.25 ft.
45	95-07163117	Panel, Side, Left	1
46	95-07163116	Cover, Top	1
47	10-99075	Label, Operating Instructions	1
48	95-07163102	Panel, Rear	1
49	2-0148	Plug, 7/8" Plastic	1
50	90-2022	Nut, Cage, 1/4" x 16 Gauge	30
51	6-04110	Box, Junction 3 Hole, 3/4"	1
52	2-1062	Elbow, 1/2" JIC x 1/2", 90°	2
		(5020, 5030)	1
	2-10630	Elbow, 3/4" JIC x 1/2", 90° (5020, 5030)	2
53	6-0411	Cover Plate, Junction Box, 2" x 4"	1
	11-1042	▲ Ground Label	1
55	4-02100030	Inlet Hose, 30", Water Supply	1
56	4-02100045	Inlet Hose, 45", Water Supply	1

EXPLODED VIEW PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
57	2-00602	Elbow, 1/2" JIC x 1/2" Fem, 90°	1
58	2-1053	Nipple, 1/2" JIC 1/2" MPT Pipe	
		(5020, 5030)	2
		(All others)	1
59	2-10942	Swivel, 1/2" MP x 3/4" GHF, w/Strainer	1
60	10-09003	Label, Cold Water Inlet	1
61	2-1100	Adapter, 1/2" x 1/2" Pipe	1
62	2-0108	Bumper Pad, Engine	18
63	2-01041	Pad, Soft Rubber, 50 DURO	6
64	95-07163100	Assembly, Frame	1
65	2-2007	Nipple, 3/8" x 3/8" NPT ST Male	1
66	2-00575	Elbow, 3/8" Steel, Street, 45°	1
67	95-07101226	Block, Discharge, 1/2" x 1/2" Brass	1
68	2-3409	Disk, Rupture Assy, 7000 PSI	1
69	2-1108	Hose Barb, 1/2" Barb x 3/8" MPT, Push-On	1
70	4-05088	Thermostat, Adjustable, 302°F	1
71	2-0008	Nipple 1/2" Hex, Steel	1
72	4-02110000	Hose, 1/2" Push-On	3.33 ft.
73	95-07163099	Top, Burner Wrap, 20"	1
74	10-02025A	Label, Hot/Caliente w/Arrows Warning	2
75	7-01415	Insulation, Tank Head, 20", 10" Opening	1
76	90-50045	Clip, Retaining, U-Type	4
77	95-07121220	Coil, Dura, 20" Dia., SCH. 80	1
78	95-07163094	Wrap, Outer Assy, 20" Coil	1
79	90-1016	Bolt, 3/8" x 1", NC HH	8
80	95-07163126	Cover, Control Panel, Logo	1
	95-07163115	Cover, Control Panel, Remote	1
81	11-0353	Label, Control Panel, Logo	1
	11-0354	Label, Control Panel, Remote Logo	1
	11-0508	Label, Control Panel	1
	11-0509	Label, Control Panel, Remote	1
82	95-07163118	Panel, Side, Right	1
83	4-02021236	Hose, 1/4" x 36", 2 Wire, Gauge Hose (Steam Option)	1
84	90-20231	Nut, Cage, 1/4" x 12 Gauge	12
85	2-00681	Bushing, 1/2" x 3/8" Steel	1
86	10-09004	Label, Hot Water Outlet	1
87	2-01411	Bushing, 1" Snap	3
88	2-01081	Plug, Rubber	3
89	2-01037	Grommet, 1-5/16" Rubber	1

ITEM	PART NO.	DESCRIPTION	QTY
90	90-2002	Nut, 3/8" ESNA (3010, 3520)	6
		(4020, 3530, 5020)	8
	90-2001	Nut, 5/16" ESNA (3010, 3520)	4
91	90-1016	Bolt, 3/8" (3010, 3520)	6
		(4020, 3530, 5020)	8
	90-1006	Bolt, 5/16" (3010, 3520)	4
92	10-08021	Label, Disconnect Pwr Supply	1
93	90-1030	Bolt, 8mm x 16mm Hex Head	4
94	90-4008	Washer, 5/16" Lock Split Ring	4
95	90-4001	Washer, 5/16" Flat	4
96	95-07141110	Retainer, Pump Take-Up (3010)	8
97	90-4002	Washer, 3/8" (3010, 3520)	12
		(4020, 3530, 5020)	16
	90-4001	Washer, 5/16" (3010, 3520)	8
98	6-0517	▲ Strain Relief, 3/4" (3010;3520 3530B,C;4020;5020B,C)	1
	6-05171	▲ Strain Relief, 1" (3530A; 5020A; 5030B,C;)	1
99	2-1019	Elbow, 3/8" Female, Brass	1
100	2-00742	Adapter, 1/2" x 1/2" Pipe STL	1

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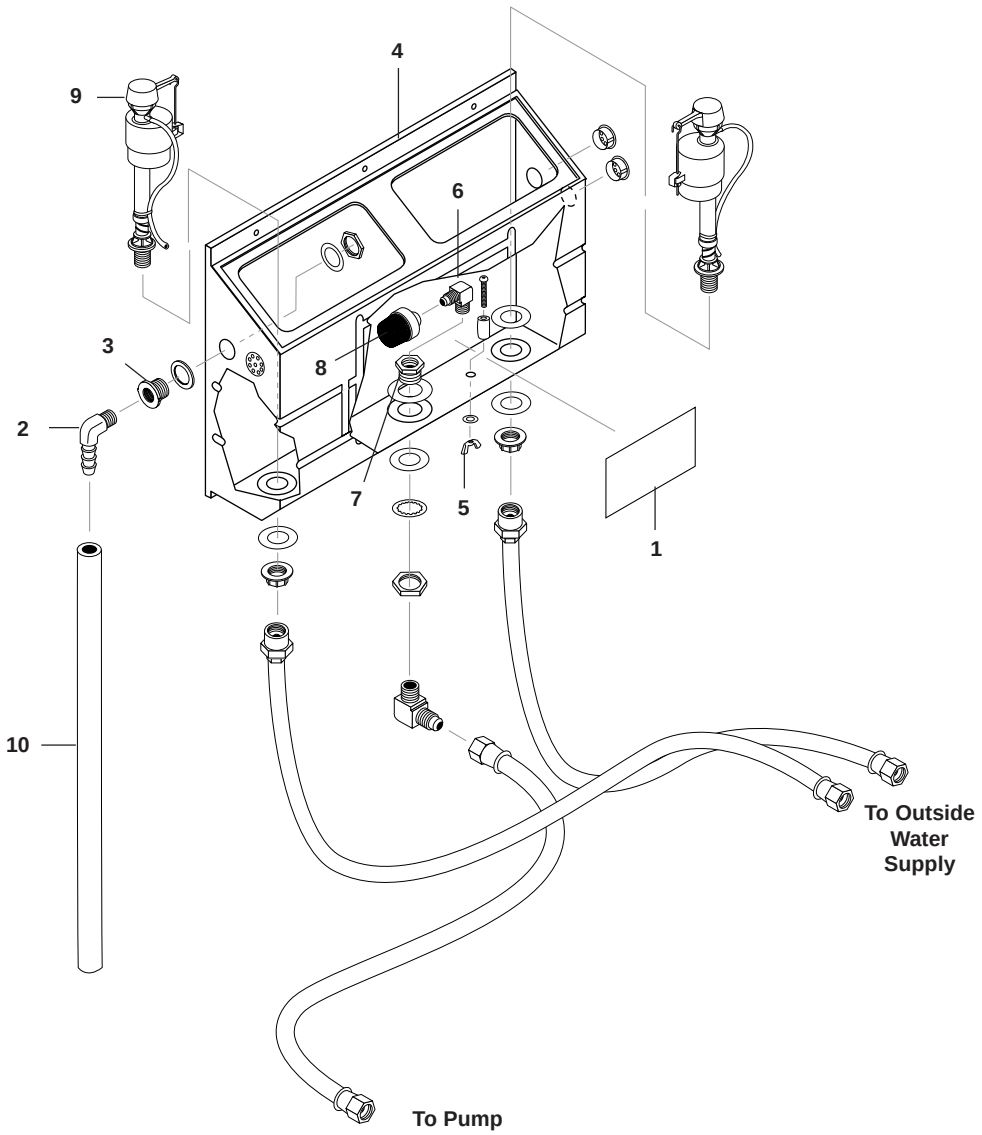
FLOAT TANK ASSEMBLY

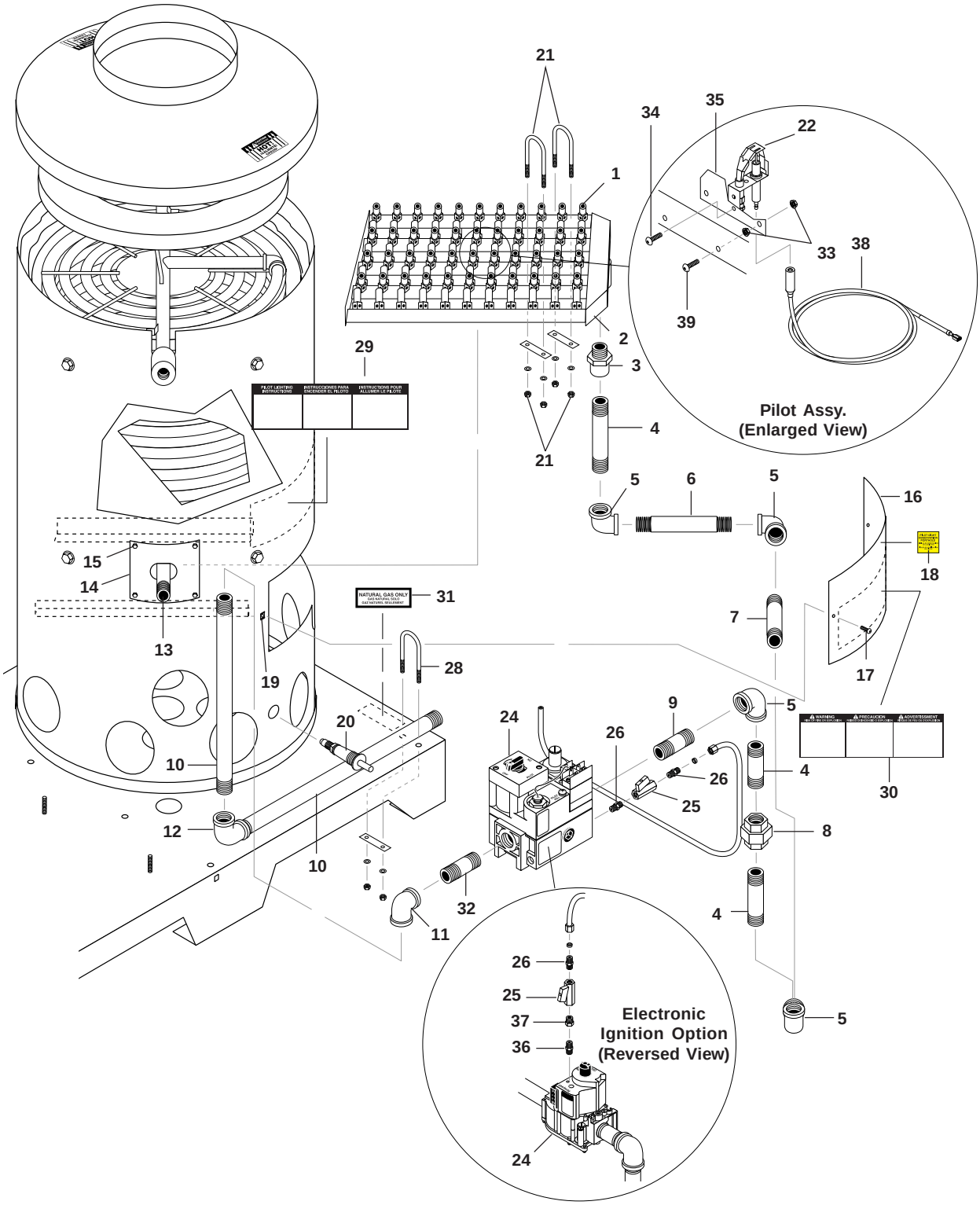


FLOAT TANK PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	11-0603	Label, Stripe 17"	1
2	2-0100379	Adapter, 3/4" x 3/4" MT x Insert, 90°	1
3	2-010058	Bulkhead, 3/4" Polypropylene	1
4	2-01164	Tank, Plastic Universal Float	1
5	2-0151	Plug, Float Tank	1

ITEM	PART NO.	DESCRIPTION	QTY
6	2-1062	Elbow, 1/2" JIC x 1/2", 90°	1
	2-1024	Elbow, 1/2" Street (301007)	1
	2-10062	Nipple, 3/16" Modified Close	1
7	2-11041	Connector, 1/2" Anchor	1
8	2-1906	Strainer, 1/2" Basket	1
9	2-3014	Valve, Fluidmaster, 400A, Float	2
10	4-02120000	Hose, 3/4" Push-On	2 ft.

BURNER ASSEMBLY



BURNER ASSEMBLY PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	7-7021	Jet, Orifice, #54 Natural Gas	44
	7-7022	Jet, Orifice, #69	2
2	95-031610/54	Burner Assy, Sq., Small #54	1
	95-031610/65	Burner Ring, Small, Square, #65	
		Nozzles	1
3	2-001359	Bushing, 1" x 3/4", Black, Steel Hex	1
4	2-00162	Nipple, 3/4" x 3", Black Pipe	3
5	2-00293	Elbow, 3/4", Black, 90°	4
6	2-00164	Nipple, 3/4" x 6", Black Pipe	1
7	2-00163	Nipple, 3/4" x 2", Black	1
8	2-0087	Union, 3/4", Black Pipe	1
9	2-00151	Nipple, 3/4" x Close, Black	1
10	95-07163081	Nipple, 1" NPT x 15", Black, SCH. 40	2
11	2-00295	Elbow, 1" x 3/4", Reducing, Black	1
12	2-00291	Elbow, 1", Black, 90°	1
13	2-00091	Nipple, 1/2" x 3", Galv. SCH. 80	1
14	95-0712113	PHW/VNG Insulation Retainer Plate	1
15	90-2999	Screw, #10 x 1/2", TEK	4
16	95-07163097	Cover, Burner Access, 20" Coil	1
17	90-19942	Screw, 10/32" x 3/4", Hex Wash SL Mach/Black	2
18	10-99032	Label, Pilot Light Hole	1
	10-99077	Label, Pilot Light Warning	1

ITEM	PART NO.	DESCRIPTION	QTY
19	90-2018	Nut, Cage, 10/32" x 16 Gauge	2
20	7-70162	Ignitor, Piezo #1244-42	1
	7-70164	Washer, Panel Adapter, Piezo 1244-26	1
21	90-10131	U-Bolt, 5/16" x 3", Pipe	2
22	7-7CH1	Pilot, Piezo (Millivolt)	1
	7-70360	Thermopile, 47”	1
	7-702371	Igniter (Electronic Ignition)	1
23	7-0150	Tubing, Aluminum, 1/4" Dead Soft (Electronic Ignition)	36”
		(Millivolt)	25”
24	7-7000CH1	Valve, Gas, VS820A (Millivolt)	1
	7-700021	Valve, Gas, VR8304 (Electric Ignition)	1
	7-70232	▲ LP Conversion, Millivolt	1
	7-702320	▲ LP Conversion, Electric Ign.	1
25	2-3006	Valve, Ball, 1/4" Female x 1/4" Female, UL Listed #12	1
26	2-1118	Connector, 1/4" Tube x 1/4"	
		(Electronic Ignition)	1
		(Millivolt)	2
27	95-07163085	▲ Splash Guard	1
28	90-10130	U-Bolt, 5/16" x 1", Pipe	1
29	10-99077	Label, Pilot Light Warning	1
30	10-02020	Label, Burner Instructions	1
31	10-02024	Label, Natural Gas	1
32	2-00165	Nipple, 3/4" x 5" Black Pipe	1
33	90-017	Nut, 10/32” Keps	4
34	90-19942	Screw, 10/32” x 3/4”, Hex	2
35	95-07166000	Bracket, Pilot Access	1
36	2-1117	Connector, 1/4” Tube x 1/8” Pipe (Electric Ignition)	1
37	2-1072	Bushing, 1/4” x 1/8” Pipe (Electric Ignition)	1
38	6-01352	Ignitor Cable, 48” (Electric Ignition)	1
39	90-1991	Screw, 10/32” x 3/4” Hex	4

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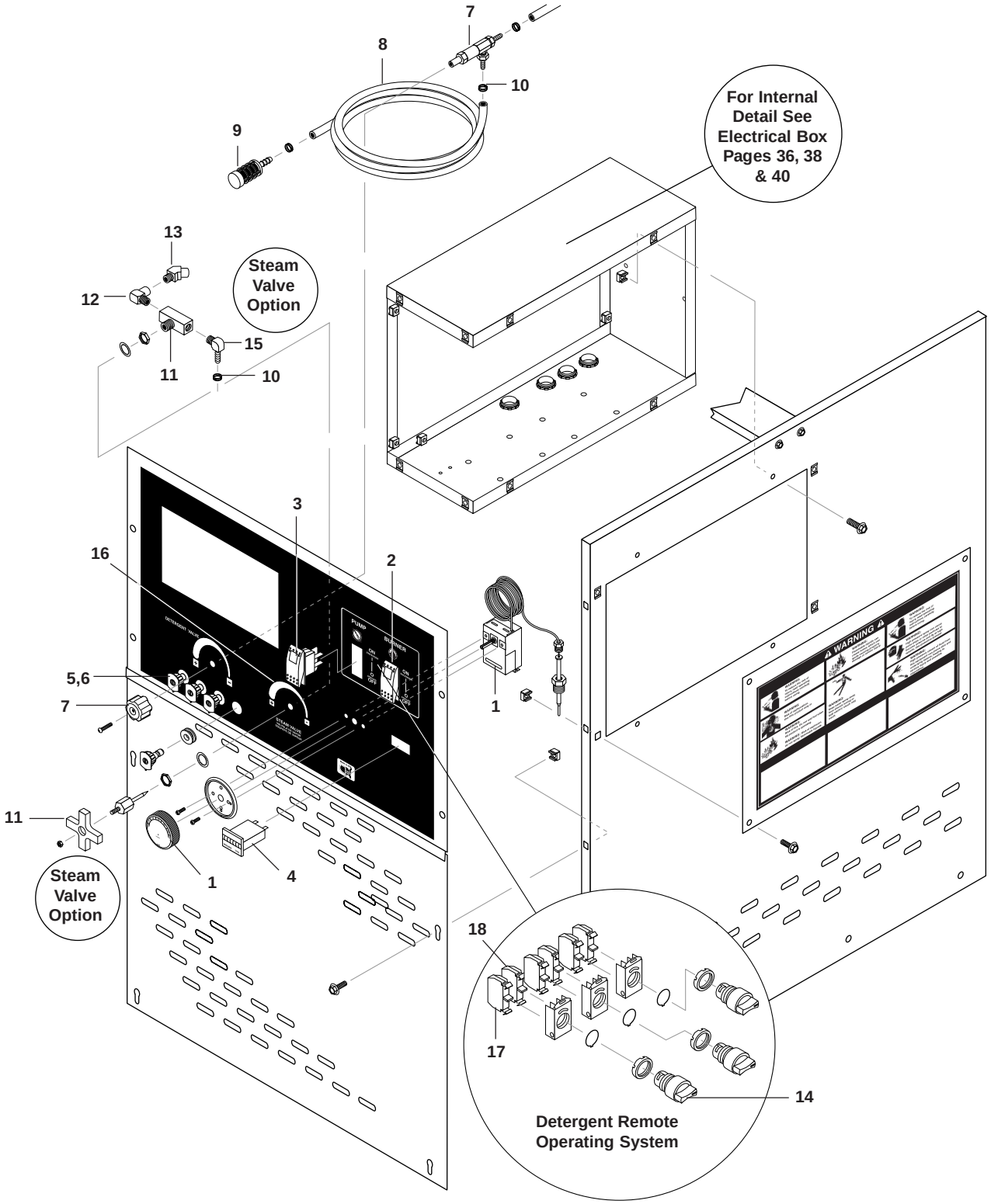
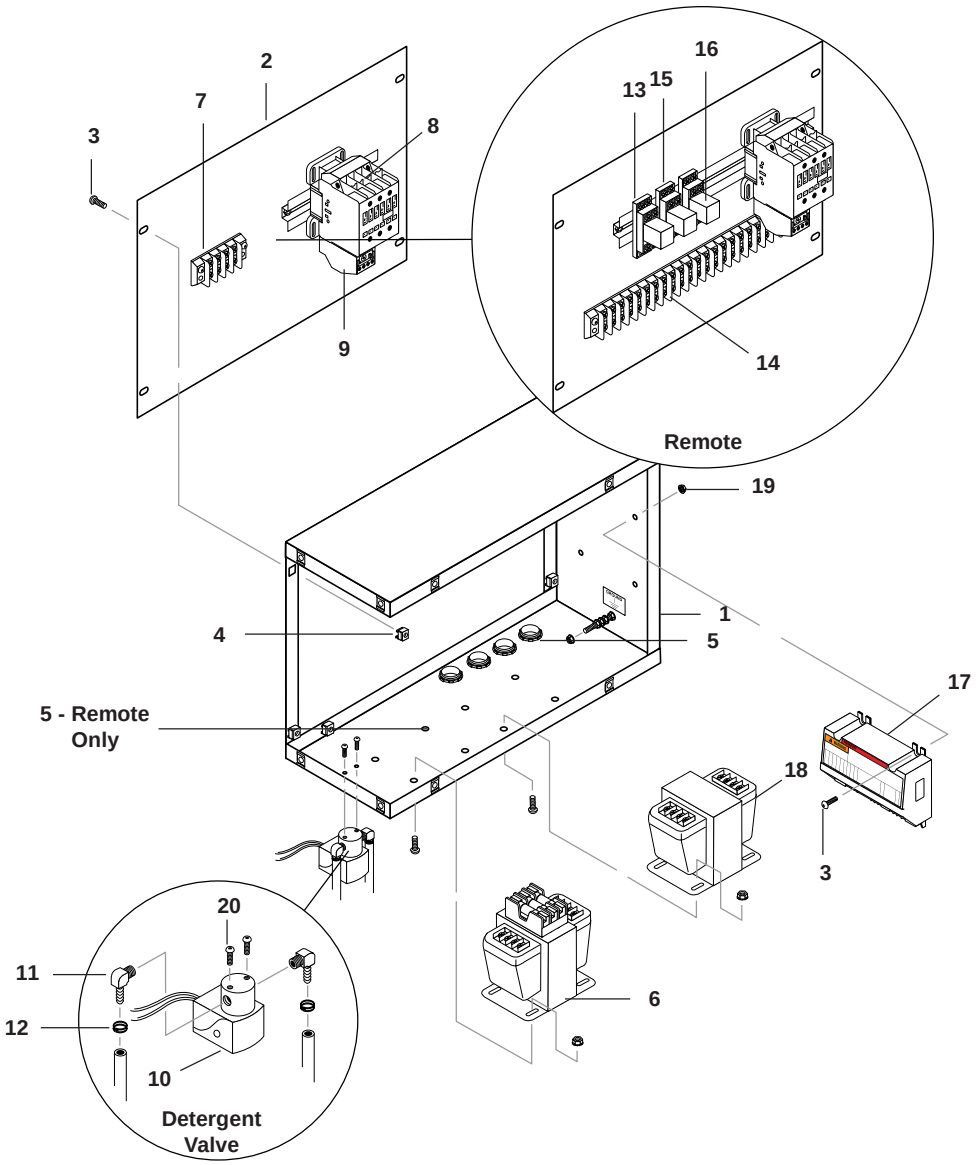
CONTROL PANEL EXPLODED VIEW



CONTROL PANEL PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	4-05088	Thermostat, Adjustable	1
2	6-020240	Switch, Rocker, Carling w/Green Lens	2
3	6-020241	Switch, Rocker, Carling Red Actuator (Time Delay)	1
4	4-050822	Hour Meter, HOBBS	1
5	2-0103	Grommet, Rubber, Nozzle Holder	4
6		Nozzle (Please See Page 25)	1
7	2-30152	Valve, Metering, 1/4" Hose	1
8	4-02080000	Tube, 1/4" x 1/2", Clear Vinyl	10 ft.
9	2-1905	Strainer, 1/4" w/Check Valve	1
10	2-9040	Clamp, Hose, UNI .46 - .54	3
11	2-30151	Valve, Flow Control/Metering Steam Option	1
12	2-0030	Elbow, 1/4" Street (Steam Option)	1
13	2-00330	Elbow, 45°, 1/4" Street, (Steam Option)	1
14	6-2020	Switch, Selector, w/Red Lever	3
15	2-1089	Hose Barb, 1/4" Barb x 1/4" Pipe, 90° (Steam Option)	1
16	10-99071	Label, Steam Valve (Steam Option)	3
17	6-2000	Block, Contact, N/C	3
18	6-2001	Block, Contact, N/O	3

STANDARD ELECTRICAL BOX EXPLODED VIEW & PARTS LIST



ITEM	PART NO.	DESCRIPTION	QTY
1	95-07163028	Box, Electrical	1
2	95-07163030	Panel, Electrical Box Side	1
	11-1042	▲ Ground Label	1
3	90-1991	Screw, 10/32" x 1/2" BHSOC Black	20
4	90-2018	Nut, Cage, 10/32" x 16 Gauge	4
5	6-0517	Strain Relief, 3/4"	3
		(Remote Option)	1
6	Fuse, See Specifications Pages		
7	6-0504	Block, Terminal, 4 Pole	1
8	Contactor, See Specifications Pages		
9	Overload, See Specifications Pages		
10	6-1401590	Valve, Chemical Less Solenoid (Remote)	1
	6-140160	Solenoid Coil, 120V (Remote)	1
11	2-1089	Hose Barb, 1/4" Barb x 1/4" Pipe, 90° (Remote)	2

ITEM	PART NO.	DESCRIPTION	QTY
12	2-9000	Clamp, Screw, #4 (Remote)	2
13	6-021595	Din Rail, 35 mm	4"
		(Remote)	8"
14	6-05041	Block Terminal, 16 Pole (Remote)	1
15	6-03541	Base, Relay, SH2B-05, IDEC (Remote)	3
16	6-03621	Relay, 120V, RH2B-UL-AC120 (Remote)	3
17	7-701510	Ignition, Electronic Control	1
18	6-60121	Transformer, Micron, 120/240V-24V,.050KVA, Electronic Ignition	1
19	90-017	Nut, 10/32", Keps	17
20	90-199940	Screw 10/32" x 1/4" (Remote)	2

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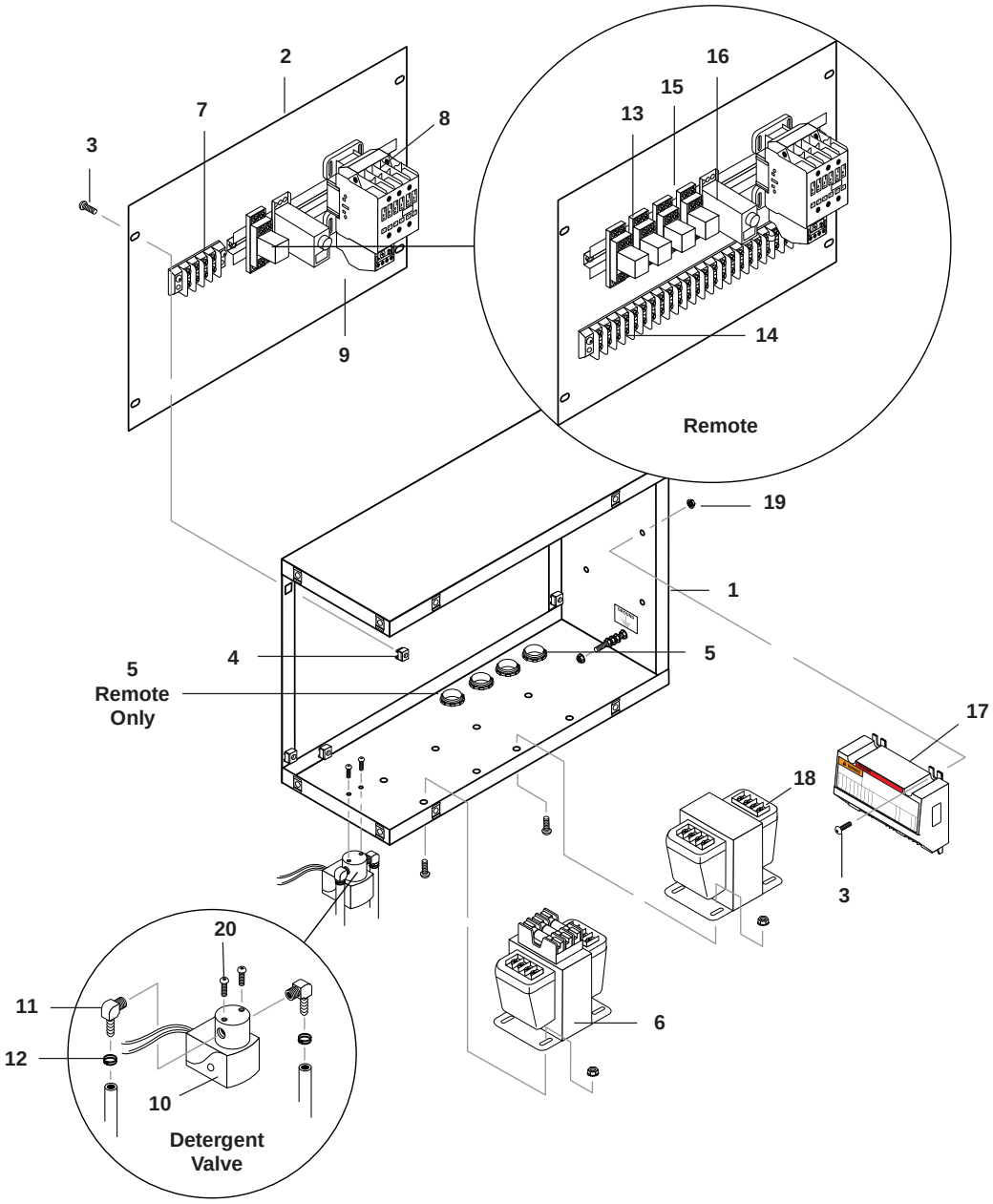
TIME DELAY ELECTRICAL BOX EXPLODED VIEW

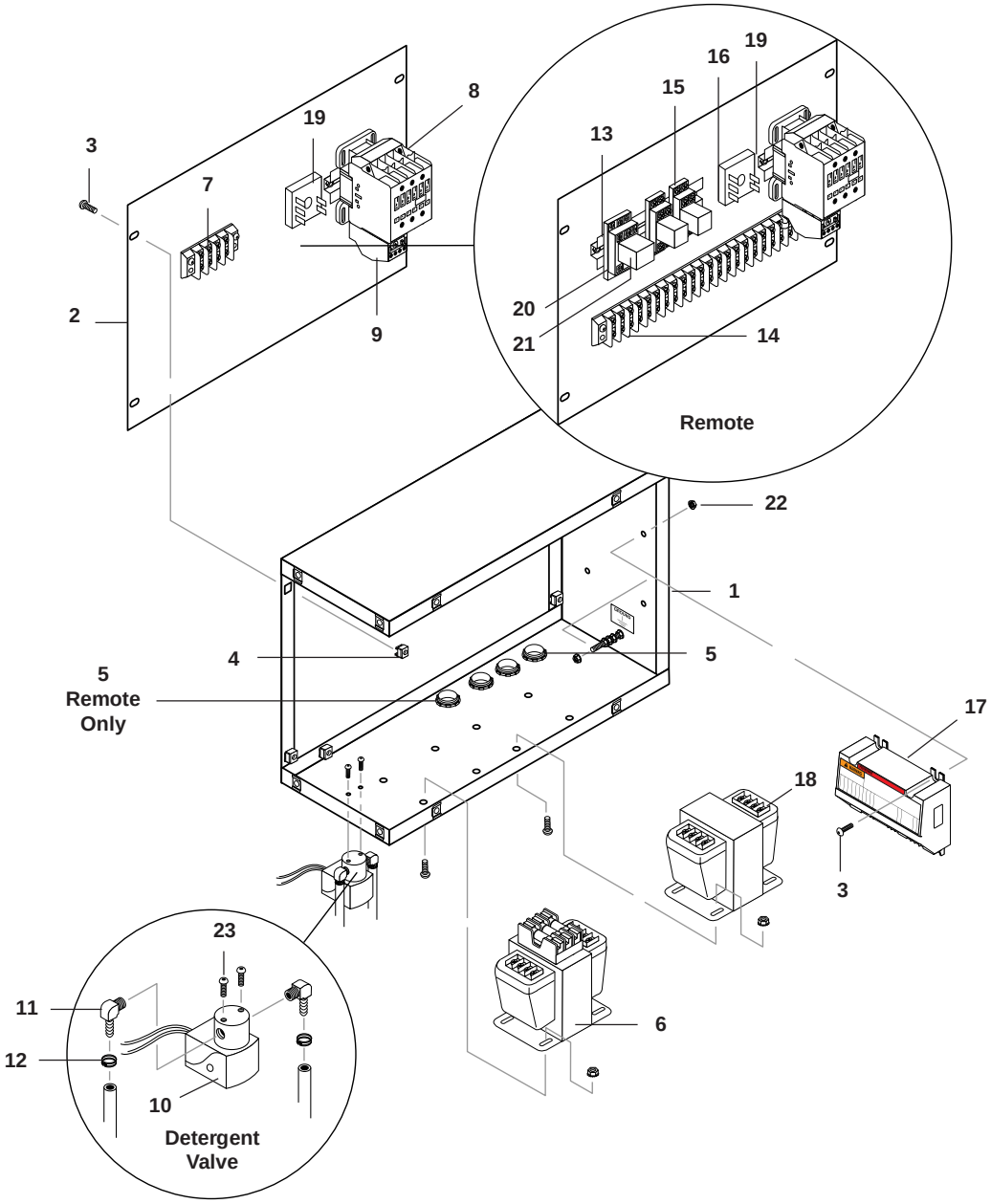


TIME DELAY ELECTRICAL BOX PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	95-07163028	Box, Electrical	1
2	95-07163030	Panel, Electrical Box Side	1
	11-1042	▲ Ground Label	1
3	90-1991	Screw, 10/32" x 1/2" BHSOC Black	20
4	90-2018	Nut, Cage, 10/32" x 16 Gauge	4
5	6-0517	Strain Relief, 3/4"	3
		(Remote Option)	1
6	Fuses, See Specifications Pages		
7	6-0504	Block, Terminal, 4 Pole	1
8	Contactor, See Specifications Pages		
9	Overload, See Specifications Pages		
10	6-1401590	Valve, Chemical Less Solenoid (Remote)	1
	6-140160	Solenoid Coil, 120V (Remote)	1
11	2-1089	Hose Barb, 1/4" Barb x 1/4" Pipe, 90° (Remote)	2
12	2-9000	Clamp, Screw, #4 (Remote)	2
13	6-021595	Din Rail, 35 mm	4"
		(Remote)	8"
14	6-05041	Block Terminal, 16 Pole (Remote)	1
15	6-03541	Base, Relay, SH2B-05, IDEC (Remote)	3
16	6-03621	Relay, 120V, RH2B-UL-AC120 (Remote)	3
17	7-701510	Ignition, Electronic Control	1
18	6-60121	Transformer, Micron, 120/240V-24V, .050 KVA, Electronic Ignition	1
19	90-017	Nut, 10/32", Keps	17
20	90-199940	Screw, 10/32" x 1/4" (Remote)	2

▲ Not Shown

AUTO START ELECTRICAL BOX EXPLODED VIEW



AUTO START ELECTRICAL BOX EXPLODED VIEW

ITEM	PART NO.	DESCRIPTION	QTY
1	95-07163028	Box, Electrical	1
2	95-07163030	Panel, Electrical Box Side	1
	11-1042	▲ Label, Ground	1
3	90-1991	Screw, 10/32" x 1/2" BHSOC Black	20
4	90-2018	Nut, Cage, 10/32" x 16 Gauge	4
5	6-0517	Strain Relief, 3/4"	3
		(Remote)	1
6	Fuses, See Specifications Pages		
7	6-0504	Block, Terminal, 4 Pole	1
8	Contactor, See Specifications Pages		
9	Overload, See Specifications Pages		
10	6-1401590	Valve, Chemical Less Solenoid (Remote)	1
	6-140160	Solenoid Coil, 120V (Remote)	1
11	2-1089	Hose Barb, 1/4" Barb x 1/4" Pipe, 90° (Remote)	2
12	2-9000	Clamp, Hose, UNI .46 - .54, (Remote)	2

ITEM	PART NO.	DESCRIPTION	QT
13	6-021595	Din Rail, 35 mm	4"
		(Remote)	8"
14	6-05041	Block Terminal, 16 Pole (Remote)	1
15	6-03541	Base, Relay, SH2B-05, IDEC (Remote)	2
16	6-03621	Relay, 120V, RH2B-UL-AC120 (Remote)	2
17	7-701510	Ignition, Electronic Control	1
18	6-60121	Transformer, Micron, 120/240V-24V, .050 KVA Electronic Ignition	1
19	6-06880	Timer, Solid State 120V, 5-60 Min. Auto Start	1
20	6-035210	Relay, Socket, IDEC (Remote)	1
21	6-036210	Relay, Latch, IDEC (Remote)	1
22	90-017	Nut, 10/32", Keps	17
23	90-199940	Screw, 10/32" X 1/4"	2

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SPECIFICATIONS

	PUMP						MOTOR					
Model	Pump Model	Pump #	Pulley	Pulley Description	Pump Bushing	Bushing Pt#	Motor Pt#	HP	Voltage/ Hertz	Motor Pulley	Pulley Pt#	Motor Bushing
301007D	WML-2540	6-1625	5-40107401	AK74H	24MM	5-512024	5-1047	2	120v 1ph/60Hz	AK25x5/8	5-40102558	NA
352007A	WML-2540	6-1625	5-40208401	2AK84H	24MM	5-512024	5-1053	5	230v 1ph/60Hz	2AK32H	5-40203201	Hx3/4
353007A	GM4035	5-1920	5-40506701	2BK67H	24MM	5-512024	5-1013	7.5	230v 1ph/60Hz	2BK45H	5-40504501	Hx1-3/8
353007B	GM4035	5-1920	5-40506701	2BK67H	24MM	5-512024	5-40145	7.5	230V 3ph/60Hz	2BK45H	5-40504501	Hx1-3/8
353007C	GM4035	5-1920	5-40506701	2BK67H	24MM	5-512024	5-10145	7.5	460V 3ph/60Hz	2BK45H	5-40504501	Hx1-3/8
402007A	GM4035	5-1920	5-40207401	2AK74H	24MM	5-512024	5-10401	6	230v 1ph/60Hz	2AK54H	5-40205401	Hx1-1/8
402007B	GM4035	5-1920	5-40207401	2AK74H	24MM	5-512024	5-1011	6	230V 3ph/60Hz	2AK54H	5-40205401	Hx1-1/8
402007C	GM4035	5-1920	5-40207401	2AK74H	24MM	5-512024	5-1011	6	460V 3ph/60Hz	2AK54H	5-40205401	Hx1-1/8
502007A	GM5030	5-1915	5-40506701	2BK67H	24MM	5-512024	5-1013	7.5	230v 1ph/60Hz	2BK60H	5-40506001	Hx1-3/8
502007B	GM5030	5-1915	5-40506701	2BK67H	24MM	5-512024	5-10145	7.5	230V 3ph/60Hz	2BK60H	5-40506001	Hx1-3/8
502007C	GM5030	5-1915	5-40506701	2BK67H	24MM	5-512024	5-10145	7.5	460V 3ph/60Hz	2BK60H	5-40506001	Hx1-3/8
503007B	GM5030	5-1915	5-40506701	2BK67H	24MM	5-512024	5-1018	10	230V 3ph/60Hz	2BK57H	5-405057001	Hx1-3/8
503007C	GM5030	5-1915	5-40506701	2BK67H	24MM	5-512024	5-1018	10	460V 3ph/60Hz	2BK57H	5-405057001	Hx1-3/8

SPECIFICATIONS

	MOTOR					CONTROLS				
	Bushing PT#	Belts Size(Qty.)	Belt Pt#	Motor Contactor	Motor Overload	Trans-former	Primary Fuse	Primary Fuse Pt#	Secondary Fuse	Secondary Fuse Pt#
301007D	NA	AX34 (1)	5-602034	6-4031	N/A	N/A	N/A	N/A	N/A	N/A
352007A	5-511075	AX34 (2)	5-602034	6-4013	N/A	6-60111	1 AMP	6-02294	8/10	6-0229810
353007A	5-511138	BX34 (2)	5-604034	6-4018	6-5015	6-60111	1 AMP	6-02294	8/10	6-0229810
353007B	5-511138	BX34 (2)	5-604034	6-4010	6-5012	6-60111	1 AMP	6-02294	8/10	6-0229810
353007C	5-511138	BX34 (2)	5-604034	6-4004	6-5010	6-60111	1/2 AMP	6-02295	8/10	6-0229810
402007A	5-511113	AX36 (2)	5-602036	6-4018	N/A	6-60111	1 AMP	6-02294	8/10	6-0229810
402007B	5-511113	AX36 (2)	5-602036	6-4010	6-5011	6-60111	1 AMP	6-02294	8/10	6-0229810
402007C	5-511113	AX36 (2)	5-602036	6-4004	6-5009	6-60111	1/2 AMP	6-02295	8/10	6-0229810
502007A	5-511138	BX36 (2)	5-604036	6-4018	6-5015	6-60111	1 AMP	6-02294	8/10	6-0229810
502007B	5-511138	BX36 (2)	5-604036	6-4010	6-5012	6-60111	1 AMP	6-02294	8/10	6-0229810
502007C	5-511138	BX36 (2)	5-604036	6-4004	6-5010	6-60111	1/2 AMP	6-02295	8/10	6-0229810
503007B	5-511138	BX36 (2)	5-604036	6-4013	6-5013	6-60111	1 AMP	6-02294	8/10	6-0229810
503007C	5-511138	BX36 (2)	5-604036	6-4007	6-5011	6-60111	1/2 AMP	6-02295	8/10	6-0229810

SHARK LIMITED NEW PRODUCT WARRANTY
PRESSURE WASHERS

WHAT THIS WARRANTY COVERS

All SHARK PRESSURE WASHERS are warranted by SHARK to the original purchaser to be free from defects in materials and workmanship under normal use, for the periods specified below. This Limited Warranty is subject to the exclusions shown below, is calculated from the date of the original purchase, and applies to the original components only. Any parts replaced under this warranty will assume the remainder of the part's warranty period. This warranty applies to the original purchaser and is not transferable.

LIMITED LIFETIME PARTS WARRANTY:

Components manufactured by SHARK, such as frames, handles, and belt guards. Forged brass pump manifold. All heating coils will have a three year warranty. Internal components (excluding oil seals) on the oil-end of all pressure washer pumps will have a seven year warranty.

ONE YEAR PARTS WARRANTY:

All other components, excluding normal wear items as described below, will be warranted for one year on parts. Warranty on these parts will be for one year regardless of the duration of the original component manufacturer's part warranty.

WARRANTY PROVIDED BY OTHER MANUFACTURERS:

Motors, generators, and engines, which are warranted by their respective manufacturers, are serviced through these manufacturers' local authorized service centers. SHARK cannot provide warranty on these items.

WHAT THIS WARRANTY DOES NOT COVER

This warranty does not cover the following items:

1. Normal wear items, such as nozzles, guns, discharge hoses, wands, quick couplers, seals, filters, gaskets, O-rings, packings, pistons, pump valve assemblies, strainers, belts, brushes, rupture disks, fuses, pump protectors.
2. Damage or malfunctions resulting from accidents, abuse, modifications, alterations, incorrect installation, improper servicing, failure to follow manufacturer's maintenance instructions, or use of the equipment beyond its stated usage specifications as contained in the operator's manual.
3. Damage due to freezing, chemical deterioration, scale buildup, rust, corrosion, or thermal expansion.
4. Damage to components from fluctuations in electrical or water supply.
5. Normal maintenance service, including adjustments, fuel system cleaning, and clearing of obstructions.
6. Transportation to service center, shop labor charges, field labor charges, or freight damage.

WHAT YOU MUST DO TO OBTAIN WARRANTY SERVICE

While not required for warranty service, we request that you register your SHARK pressure washer by returning the completed registration card. In order to obtain warranty service on items, you must return the product to an Authorized SHARK Dealer, freight prepaid, with proof of purchase, within the applicable warranty period. If the product is permanently installed, you must notify your Authorized SHARK Dealer of the defect. The Authorized Dealer will file a claim, which must subsequently verify the defect. In most cases, the part must be returned to SHARK freight prepaid with the claim. For warranty service on components warranted by other manufacturers, the Authorized Dealer can help you obtain warranty service through these manufacturers' local authorized service centers.

LIMITATION OF LIABILITY

SHARK'S liability for special, incidental, or consequential damages is expressly disclaimed. In no event shall SHARK'S liability exceed the purchase price of the product in question. SHARK makes every effort to ensure that all illustrations and specifications are correct, however, these do not imply a warranty that the product is merchantable or fit for a particular purpose, or that the product will actually conform to the illustrations and specifications. **THE WARRANTY CONTAINED HEREIN IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.** SHARK does not authorize any other party, including authorized Dealers, to make any representation or promise on behalf of SHARK, or to modify the terms, conditions, or limitations in any way. It is the buyer's responsibility to ensure that the installation and use of SHARK products conforms to local codes. While SHARK attempts to assure that its products meet national codes, it cannot be responsible for how the customer chooses to use or install the product.

SHARK PRESSURE WASHERS
1-800-771-1881 • www.shark-pw.com

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